

# The Iron Age

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A Review of the Hardware, Iron and Metal Trades.

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## Electrical Lamps for Firearms.

At the meeting of the Paris Academy of Sciences, July 6, G. Trouve described two new applications of electricity, which relate to the firing of arms at night. The first consists of a luminous electric button, and the second of a powerful electric projector. These two devices are removable, and they can be applied instantaneously to any ordinary arms, to guns used for hunting as well as to weapons of war, to mitrailleuses as

places his weapon in position for firing, the pile immediately begins to operate and illuminates the button, and that when the gun is held upright the pile ceases to operate and the button is no longer luminous. The light given by the button is sufficient for taking aim, but cannot be seen by a person standing 3 feet from the gun. This is, of course, a great advantage, it being very difficult to take aim correctly in the dark. The luminous electric projector consists of an incandescent lamp and a little parabolic

## The Microscopic Structure of Iron and Steel.

At the Chattanooga meeting of the American Institute of Mining Engineers, Mr. F. Lynwood Garrison, of Philadelphia, presented some very interesting microscopic sections of iron and steel, which have been reproduced in an admirable manner for the pages of the "Transactions." We follow Mr. Garrison's description of the different sections, as shown in the illustrations:

iron the graphite plates seem to group themselves in bunches or lumps. This seems to be more characteristic of cast than of crude pig iron. It is not unlikely that the second melting and slow cooling enable the graphitic carbon to separate itself more readily in that way.

White pig iron exhibits a highly crystalline structure, as will be seen in Fig. 2. The intensity of the crystallization depends very much upon the degree of chilling. Thus, in a large casting made

rows and cavities, due to working and the presence of intermingled slag during the rolling. Wrought iron (not steel) does not show, even under a power of 100 diameters, the slightest trace of crystalline structure. It has been held by Percy and other authorities that the fibers were simply drawn-out crystals. I have tried in numerous instances to determine if such really was the case, and, although I have examined many longitudinal and cross sections of various grades, I cannot find that there



Fig. 1.—No. 3 Gray Pig Iron.  $\times 50$  Diameters.



Fig. 2.—White Pig Iron.  $\times 20$  Diameters.



Fig. 3.—Longitudinal Section of Rolled Bar Iron.  $\times 45$  Diameters.



Fig. 4.—Cross-Section of Rolled Bar Iron.  $\times 45$  Diameters.



Fig. 5.—Longitudinal Section of a Bolt of Clapp & Griffiths Steel.  $\times 45$  Diameters.



Fig. 6.—Cross-Section of a Bolt of Clapp & Griffiths Steel.  $\times 45$  Diameters.



Fig. 7.—Crucible Tool Steel.  $\times 45$  Diameters.

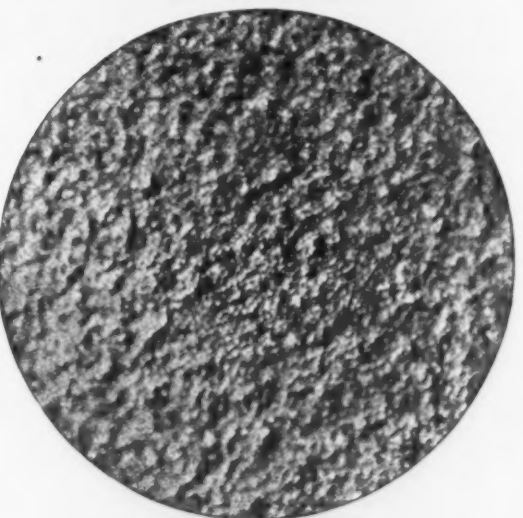


Fig. 8.—File Steel.  $\times 40$  Diameters.



Fig. 9.—Meteoric Iron.  $\times 25$  Diameters.

## THE MICROSCOPIC STRUCTURE OF IRON AND STEEL.

well as to cannon—in fact, to any firearms. Their function is automatic. The electric button is the size of an ordinary metallic button, and consists of a fine platinum thread introduced into a little glass tube, which is in turn protected by a metallic tube. An opening is left in the metallic tube by which to take aim, but said opening is so arranged that the luminous button is visible to the person using the gun only, and cannot be seen by the enemy. The button is operated by Mr. Trouve's reversible hermetic pile, presented to the Academy of Sciences by Mr. Becquerel. This pile, which is about as large as the little finger, can be secured to the barrel of the gun, parallel with the same, by means of two rubber bands. The hermetic pile operates only when placed on its side—that is, horizontally; therefore, it will be seen that when the person using the gun

reflector, or of an incandescent lamp and a concentrating lens inclosed in a metallic tube. The apparatus is to be applied to the end of the barrel of the gun, parallel to the same, by means of two elastic bands. It is put into operation by pressing the butt of the gun against the shoulder, and by its use the point to be struck can be lighted, and, if it moves, all its movements can be followed. The generator of electricity to be used for this apparatus is the same as that used for the safety lamp invented by Mr. Trouve, and recently presented to the Academy of Sciences by Mr. Jamin. It can be worn in the belt, and its action is automatic. The services which these two apparatus are capable of rendering to armies and navies are numerous, but the great advantage which they offer is that they make it possible to aim as correctly at night as in the daytime.

Fig. 1 represents a No. 3 gray pig iron as it appears under a power of 50 diameters. The specimen was prepared and etched with the greatest possible care, so that it may be safely taken as a good example of pig iron, ranging from No. 1 to No. 4, when magnified to that degree. It will be seen to consist of a heterogeneous mixture of metallic iron and long, narrow, black plates of graphite. It does not appear to bear the slightest trace of any crystalline structure. The straight black lines which seem to stand out in relief are the graphite plates. Owing to the comparatively high power used in this case, the slightest inequalities of the etched surface cause an unevenness in the focusing; hence the obscurity of some parts of the plate. By close observation of some parts, however, the structure and the graphite plates can be made out. In many cases of pig and cast

in a metallic mold, the outer surface, which comes in contact with the mold, will be found to exhibit a high crystalline structure (such as shown in Fig. 2), while the inner part, which has cooled slowly, will show very little or perhaps no crystalline structure. This highly crystallized white iron exhibits, even under a high power, only a comparatively small number of graphitic plates. The crystalline structure in some cases is irregular, while in others the crystals are regularly arranged with their long axes normal to the surface of the mold. The plates of graphite will be found to be arranged parallel to the lines of crystallization.

Wrought iron or mild steel exhibits a fibrous structure, running in the direction in which it has been rolled. Fig. 3 shows the structure of a fine quality of rolled bar iron. The fiber is distinct and shows numerous fur-

exists any foundation for such a view. Fig. 4 shows a cross-section of the same material as Fig. 3. The furrows of Fig. 3 will be seen to be replaced by irregular cavities in the cross-section.

Figs. 5 and 6 show, respectively, a longitudinal and a cross-section of a bolt made of Clapp & Griffiths steel. The difference in structure between iron and steel can be readily seen in this case, the latter showing a fibrous and yet finely granular structure, characteristic of steel.

Hard or tool steel presents a structure entirely different from any of the preceding. It is highly crystalline, uniform in structure, and shows no lines of weakness or any tendency in the crystals to develop themselves in any given direction. Fig. 7 is a high grade crucible tool steel magnified 45 diameters.

(Continued on page 7.)



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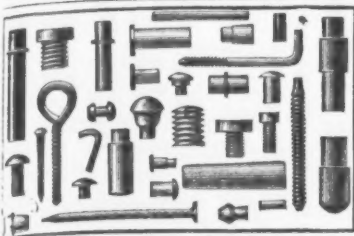


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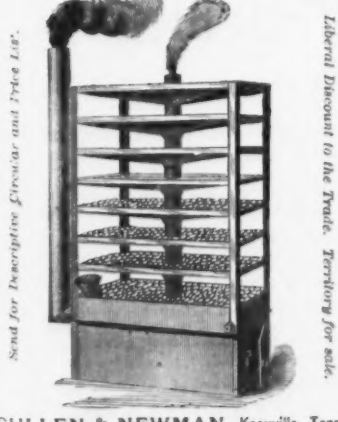
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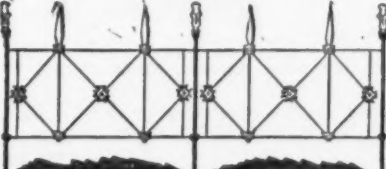
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**Colombia.**

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in commercial importance among the Cen-  
tral American Republics as regards their re-  
lations with the United States, and their  
geographical contiguity naturally favors a  
free interchange of commodities. Her trade  
with this country is now estimated at \$12,-  
000,000 per annum, out of a total foreign  
commerce only about thrice this amount.  
Little attention being given by her popula-  
tion to manufactures, the dependence of the  
well-to-do classes is very largely on im-  
ported goods. The white and mixed races  
together make an aggregate of 3,375,000  
souls in the total of 4,000,000 inhabitants.

The products to which Colombia owes its  
foreign commerce are as follows:  
Metals and precious stones mined in  
the States of Cauca, Antioquia, Tol-  
ima and Boyaca, per annum  
Quinine found in the natural forests of  
Cauca, Tolima and Santander..... \$4,300,000  
Coffee and cocoa..... 3,000,000  
Tobacco..... 2,000,000  
Cattle (Atlantic Coast or State of Bol-  
ivar)..... 1,000,000  
Hides, rubber, vegetable ivory, stuffed  
birds, plants, &c..... 1,000,000  
Total exports..... \$12,000,000

The future development of the mining in-  
terests are likely to increase relatively in im-  
portance, the metals being found in abun-  
dant in the States in the Antioquia and  
Tolima, and the production for export will  
acquire importance from year to year, as  
improved machinery for mining purposes  
shall be introduced. For some years past  
the resources of the country have been ab-  
solved to excess in the effort to construct  
railway lines, of which there are no less than  
six, all entitled to subsidies from the Gov-  
ernment treasury, to say nothing of appor-  
tions from the same source for the con-  
struction of railway bridges, the aid of  
foundries, &c. Thus far 147 miles of road  
have been completed, usually with the de-  
sign of connecting the more important points  
in the interior with the seaboard. The ad-  
vantages to be realized from improved  
means for internal communication, particu-  
larly as affecting the transportation of  
general merchandise and mineral products,  
cannot easily be overrated. To complete  
the system will require an estimated expendi-  
ture of \$30,000,000. The Magdalena River  
has long been known to citizens of the United  
States, its navigation having proved a source  
of profit to those engaged in it, and it is not  
without advantage to builders of steamships,  
who have sent out about a score of good-sized  
vessels to that destination. The cost of  
transporting a ton of freight between the  
seaboard and the capital will be reduced  
two-thirds by the competition of the rail-  
roads now in process of construction.

In her diplomatic relations, Colombia of  
late manifests a decided leaning toward the  
United States, and it is more than intimated  
that the Government is ill at ease respecting  
French designs in the canal management. A  
closer commercial alliance with the United  
States under these circumstances would  
doubtless be very acceptable.

**An Interesting Discovery.**—The cor-  
respondent of the London Times in Rome,  
writing from that city recently, says: "An  
interesting discovery illustrating the com-  
merce and the luxury of ancient Rome has  
been made close to Monte Testaccio and the  
English cemetery. The whole of that dis-  
trict to the west of the Aventine, outside the  
Porta Tregemina, was occupied by granaries  
and warehouses for the storage of imports of  
all kinds. Between the northern side of  
Monte Testaccio and the Tiber there still  
exist colossal remains of the great emporium  
built by Marcus Emilius Lepidus and Emilius  
Paulus, nearly 200 years before the Christian  
era. In the year 1868 a considerable portion  
of the quays was discovered, together with  
some 600 blocks, many of them of large size,  
of rare, variegated marbles of all kinds,  
lying just where they were landed from the  
galleys which had brought them from  
Numidia, the Grecian Islands and Asia Minor  
15 centuries ago. Now, in the course of the  
building operations in this locality two  
warehouses have been discovered, one filled  
with elephants' tusks and the other with  
lentils. It is curious to find such products stored  
side by side, but as bags of lentils were some-  
times shipped as ballast they may have served  
that purpose. The discovery would have been  
a very valuable one if, unfortunately, the  
ivory had not been much decayed."

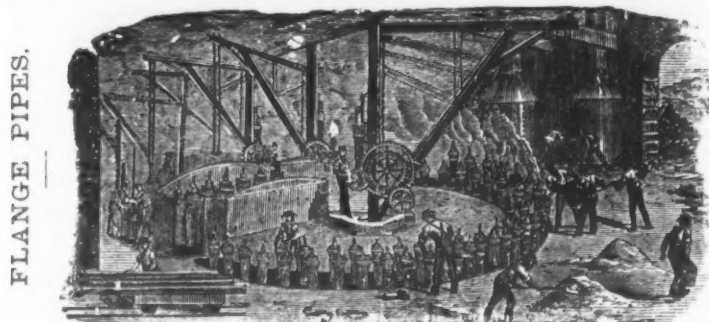
In the following figures are given, first,  
the seagoing merchant fleets of all nations,  
and, second, the steamships of all nations:  
Great Britain, 22,500 vessels, 11,200,000  
tons; United States, 6,000 vessels, 2,700,000  
tons; Norway, 4,200 vessels, 1,500,000 tons;  
Germany, 3,000 vessels, 1,400,000 tons;  
France, 2,900 vessels, 1,100,000 tons; Italy,  
3,200 vessels, 1,000,000 tons; Russia, 2,300  
vessels, 600,000 tons; all nations, 46,000  
vessels, 23,000,000 tons. Thus it will be  
seen at a glance how tremendously England  
outrivals every other marine power. Her  
preponderance is even greater in steam  
vessels, as appears by this second statement:  
All nations, 7764 steam vessels, 9,232,000  
tons; Great Britain, 4649 steam vessels,  
5,919,000 tons; France, 458 steam vessels,  
667,000 tons; United States, 422 steam  
vessels, 601,000 tons; Germany, 420 steam  
vessels, 476,000 tons; Spain, 282 steam  
vessels, 305,000 tons; Italy, 135 steam ves-  
sels, 166,000 tons; Holland, 127 steam ves-  
sels, 155,000 tons; Russia, 194 steam ves-  
sels, 149,000 tons.

The total resources of the 25 savings banks  
of New York City, July 1, were \$293,707,-  
762. The amount due depositors was \$250,-  
282,730, an increase for the six months of  
\$5,857,359. Other liabilities on July 1 were  
\$10,059, leaving a net surplus of \$43,414,072.  
The number of open accounts was 627,915.

The Duluth grain elevators, which now  
have a capacity of 9,400,000 bushels, will  
this season add space for 4,000,000 bushels,  
in hope of controlling the wheat trade of the  
Northwest.



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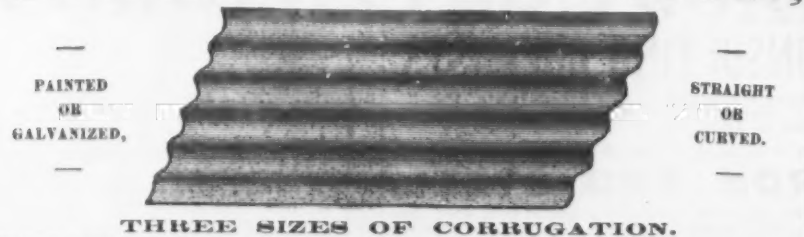
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Being desirous of securing a share of public patronage, we will endeavor to make our  
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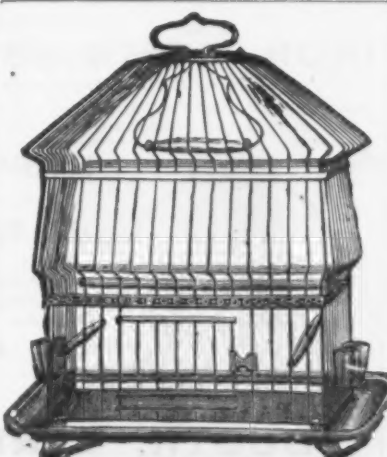
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SEE PAGE 9.

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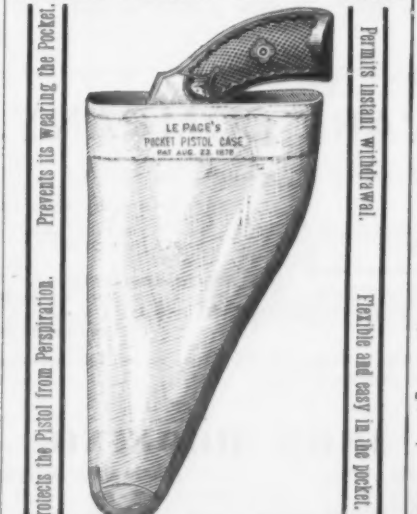
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The fact of the great strength and durability of this sink, as it is practically free from danger of breakage in transportation, handling or use, is a strong point in its favor, and that its merits are recognized by most competent judges is evident from the fact that leading houses which have been interested in the common article have taken up the Wrought Steel Sink. Twenty-five per cent. is saved in freight by purchasing Steel Sinks. Orders come from all parts of the United States, Canada, Europe and Australia.

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(Concluded from page 1.)

Fig. 8 is the usual grade of file steel magnified to the same degree. The latter differs from crucible tool steel only in being somewhat more compact and harder. All steels exhibit a similar characteristic structure, which enables a person, with practice, to judge of their relative qualities by a simple comparison of their compactness, luster and crystalline structure.

Fig. 9 shows the structure of meteoric iron, which is quite different from any of the artificial irons or alloys of iron and nickel. The peculiar lines so prominent in the figures are characteristic of meteoric iron and are commonly known as "Widmannstätten lines." I have not been able to detect these lines in all varieties of meteoric iron. It seems that, if the iron be very impure and contain but a small amount of nickel, there is little or no tendency to develop them.

One of the most interesting and peculiar changes of iron into steel which have come under my notice in connection with this subject is exhibited in Fig. 10. It shows a section made from a "burnt-out" grate-bar of ordinary cast iron. The left-hand side A shows the cast iron unaltered by the action of the heat; the right side shows where the cast iron has been completely changed to hard steel which resists the file quite as much as any tool steel. On examination of the part of the bar which came most in contact with the fire, I found that the entire surface was changed to hard, compact steel, with a thickness of about  $\frac{1}{8}$  inch. The most remarkable point to my mind is

white is an adulteration which ceases to be objectionable when the manufacturer makes the composition known, as it is of a handsome white color, entirely innocuous, fast and resisting most reagents, its great defect being that it possesses but little body or covering power. The manufacturers sell various qualities of white lead, sometimes in powder or in lumps, as genuine dry white lead, or flake white, but the greater portion in a paste holding from 7 to 9 per cent. of oil. Krems, Nottingham and Newcastle whites are pure lead, differing only in the way in which they are made. Venice white is a mixture of equal parts of white lead and sulphate of baryta. Hamburg, Holland and other whites contain from 3 to 60 per cent. of sulphate of baryta, and inferior qualities large proportions of chalk. White-lead paint is solid and durable, but the disagreeable vapors given off by the lead exercise a dangerous effect upon the health of the workmen who are engaged either upon its manufacture or use.

Many substitutes have been tried to obviate the employment of white lead. Zinc white in particular has received considerable attention; it has not such a bad effect upon the health, having no smell of itself and does not impart any to the liquids with which it may be mixed, so that any place freshly painted with it may be at once inhabited without fear of its injuring the occupants. Zinc white is the oxide of zinc; it is insoluble in water, but dissolves in hydrochloric acid, usually effervescing slightly from the escape of carbonic acid, which oxide of zinc absorbs from the air. When heated oxide of zinc becomes yellow, but resumes its white color



The Microscopic Structure of Iron and Steel.—Fig. 10.—"Burnt-Out" Grate-Bar of Cast Iron. (A) The Cast Iron Unaltered by the Action of the Fire. (B) The Cast Iron Changed Into Hard Steel by the Action of the Fire.  $\times 45$  Diameters.

that the line of demarcation is so sharply defined, thus showing little or no intermediate stage of decarbonization. The altered part B shows a structure decidedly characteristic of hard tool steel (compare with Fig. 8). In the unaltered part (A) the structure of cast iron is quite apparent, the groups and clusters of graphite plates being readily distinguishable (compare with Fig. 1). As the reasons for such a remarkable change of structure might cause considerable speculation and much difference of opinion, it would perhaps be better to defer its discussion for another opportunity and a separate paper.

Paints for Exposed Metal Surfaces.

After questions of form, strength, constructive material and similar matters have been duly settled in connection with any engineering work made of wood or metal, writes Ernest Spon, the engineer has to consider the best method of maintaining that work in good condition. Apart from working casualties, the material of which the particular work is constructed is exposed to atmospheric and chemical influences which tend more or less to modify and corrode its surface, and an artificial surface is therefore formed by applying paint. Most of the paints used for ordinary work are composed of the coloring matter, then of a quantity of white lead, with which and a particular oil they are worked into a paste of the shade required, and are afterward trimmed down with oil and turpentine when used. The white lead which thus forms the basis of most paints, and is by itself a color, is the basic carbonate of lead, a heavy earthy powder, white when first made, but soon becoming of a gray tint when exposed to the air from the action of sulphureted hydrogen. It is insoluble in water and effervesces with hydrochloric acid, dissolving, when heated, as chloride of lead, which crystallizes in needles on cooling. Dilute nitric acid easily dissolves white lead, with effervescence caused by the escape of carbonic acid gas. When heated on a knife or slip of lead it becomes yellow. It is not very generally known that white lead and oil combine with such energy that if linseed oil is poured upon a very large quantity of white lead, and the mass is allowed to stand for a few hours, the temperature becomes so high that the oil is carbonized and colors the whole a black. We should carefully avoid mixing with white lead substances which may impair its brightness or depreciate its other qualities, and it should be kept in closed vessels, otherwise it will acquire a brown shade. For good paint it should be pure and without foreign mixture; however, both manufacturers and painters add to it variable proportions of chalk, sulphate of lead and the like, and it is often mixed with that sulphate of baryta which is called baryta white, and which is prepared from the native sulphate, or from carbonate of baryta artificially treated with sulphuric acid. Baryta

in cooling. It is as brilliant, white and fine as white lead, and becomes, on drying, so hard that it will take a bright polish; it does not alter under the destructive action of sulphurous vapors, or of gas with equal weights; it covers a larger surface than carbonate of lead, but it is very dry under the brush, and therefore requires more labor in applying it, which to a great extent explains the disinclination to use it, in spite of all the efforts made in its favor. It also takes longer in drying, and when adulterated is very liable to change color.

Red lead, so largely used by engineers, is an oxide of lead usually in the form of bright red powder, which is not affected by water, but evolves the smell of chlorine when boiled with hydrochloric acid, and is slowly converted into chloride of lead. Dilute nitric acid only partly dissolves it, leaving a brown powder. On account of its durability it is frequently used as a priming coat, often the only coat given on ironwork. Care should be taken that no salt is present, otherwise a chemical action commences, blisters are formed, and the lead is reduced to the metallic condition. It has been proposed to substitute for red lead a red obtained from a sulphide of antimony, termed antimony vermilion, which is sold in a state of very fine powder, without taste or smell, and which is insoluble in water, alcohol or essential oils. It is but little acted on by acids, and foreign engineers state that when ground in oil it acquires great intensity or brightness of color, that it has a good body, is unalterable by air or light, and may be freely mixed with white lead. Black paints made from the residual products obtained in distilling coal and shale oils are largely employed for rough work. They combine readily with drying oils, and give an intense and handsome black, which is at the same time very economical. Native oxide of iron has of late years supplied us with a paint which possesses many of the good qualities of red lead without its inconveniences. Oxide of iron paints are most effective and durable paints to use on iron, as they have no tendency to change or affect the surface of the metal. An analysis of one of these paints gave peroxide of iron, 68.95; aluminous earth (clay) 1.48; burnt clay, 29.57; total, 100. The purple-brown oxide is a hydrated peroxide of iron. Grant's black is made of shale containing oxide of iron, and the well-known Torbay paint is a protoxide of iron. Under equal volumes iron paints cover more than those from lead; mixed with one-third of white lead it forms an excellent mastic, similar to that made from red lead, and which becomes very hard after drying for some time. As the iron-oxide paint resists a strong heat, it is advantageously employed for painting parts of machines and boilers. The so-called anti-corrosive paint is made of equal parts by weight of white and white lead, with half the quantity of very fine sand or road dust, with colors at pleasure. The mixture being made with water can be used as a water color, but it is usually applied as an oil paint. The prepa-

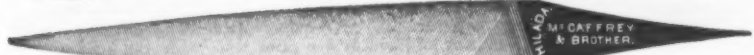


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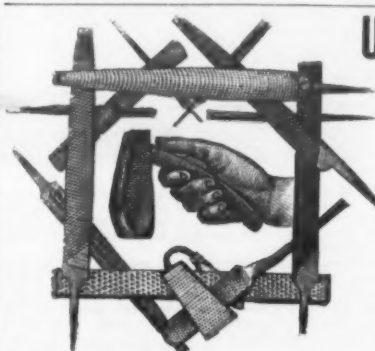
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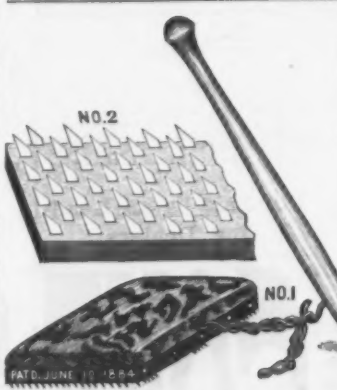
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ration of oil recommended for this purpose is  
 12 parts by weight of linseed oil, raw; one  
 part of boiled linseed oil and three parts of  
 sulphate of lime, the whole well mixed. One  
 gallon of oil thus prepared is used to 7 pounds  
 of the paint. Paints containing silica have  
 been used for both wood and metal; they  
 give a hard surface which is very durable;  
 it is stated that when mixed with  
 proper oils they will resist the action  
 of salt water or acids better than iron  
 or lead paints, that they cover well and that  
 in the case of wood they form a considerable  
 protection against fire. In addition to the  
 pigments mentioned, which are in themselves  
 colors, various tints are produced by the ad-  
 dition of ochers, earth naturally colored by  
 iron; chromes or yellows, consisting of oxide  
 of lead and chromic acid; blues such as Prus-  
 sian blue, from animal refuse burnt with  
 potash and iron; smalts from oxide of cobalt;  
 ultramarine blue, from carbonate of soda,  
 silica, alum, and sulphur; or greens, from  
 oxides, carbonates and arsenates of copper.

The oils employed in engineering painting  
 are linseed oil, nut oil and poppy oil, which,  
 in common with a few other vegetable oils  
 and resinous matters, possess the property  
 of drying, after being placed upon the sur-  
 face of a substance, into a resinous com-  
 pound. Of these oils linseed is by far the  
 most important, and its characteristics de-  
 serve careful study, as it alone has pre-emi-  
 nently the valuable qualities of great  
 strength and flexibility. It is by far the  
 strongest oil and the one that dries best and  
 firmest. It has also great body, resists  
 the inclemencies of the weather well,  
 and is least affected by the atmos-  
 phere. Good linseed oil is of a pale,  
 transparent amber color, very limpid, with  
 little smell, and comparatively sweet to the  
 taste; it is specifically lighter than impure  
 oil, and dries quickly and firmly. This oil  
 is more viscous or glutinous than other oils,  
 and can be easily recognized by its peculiar  
 odor and taste. Linseed oil improves greatly  
 in quality by age, and ought to be kept at  
 least six months after it has been expressed  
 before being used. A strong drying quality  
 can be given to the oil by boiling it either  
 with or without the addition of other sub-  
 stances. The substances thus added are  
 very various, the principal being litharge,  
 acetate or sugar of lead, red lead and oxide  
 of manganese—the last named when the  
 body of the paint is to be zinc white. The  
 most simple method of preparing oil is by  
 boiling it for a considerable time without any  
 addition, and drying oil can be prepared for  
 common work by mixing 1½ pounds of red  
 lead with 1 gallon of linseed oil, boiling them  
 together, and afterward letting the oil stand  
 for a few days for the lead to sink to the  
 bottom. A considerable drying quality may  
 be given to linseed oil and the color much  
 improved, without its being boiled, by mixing  
 about 1 pound of white lead to 1 gallon of  
 oil, and letting it stand a week or two until  
 the lead and feculent parts of the oil have  
 sunk to the bottom of the vessel in which the  
 oil is placed. This is likewise a cheap way  
 of purifying oil, as the lead can always be  
 used for common purposes. Other things  
 being equal, the most essential quality to be  
 required in oils is their drying well, which,  
 although it may be assisted by additions, is  
 yet to be desired in the oil itself, as the effect  
 of some pigments is sometimes such as to  
 counteract the strongest driers and occasion  
 great trouble and delay from the work re-  
 maining wet a considerable length of time.  
 Nut oil is more uncertain in its qualities than  
 either linseed or poppy oil, and is frequently  
 a long time drying. When of good quality  
 it is very limpid, of agreeable taste, sweet  
 smelling and free from rancidity or sediment.  
 Poppy oil is extracted by pressure from the  
 seeds of the plant, and should be white or  
 very slight yellow in color, sweet and with-  
 out smell. Both nut and poppy are far in-  
 ferior in strength, tenacity and drying qual-  
 ities to linseed but have the reputation of  
 keeping color better, and are on this account  
 sometimes employed in interior work for  
 thinning paints used for ornamental pur-  
 poses and which require to be very white or  
 carefully executed. Driers for hasten-  
 ing the drying of colors are very much used  
 in addition to the drying oils. Those most  
 approved are sugar of lead and litharge.  
 These, when ground and mixed with small  
 quantities with paints, very much assist  
 them in drying; indeed, some colors will not  
 dry without them. Red lead is also an ex-  
 cellent drier, and in cases where its color is  
 not objectionable is much employed. Sugar  
 of lead is, however, the best drier, though  
 somewhat more expensive than the others.  
 In the last or finishing coats of light colors,  
 driers are generally avoided, as they have a  
 tendency to injure the color. The spirits of  
 turpentine for thinning the colors should be  
 of good quality, which may be ascertained  
 by weighing equal quantities and comparing  
 the weights, the lightest being the best. The  
 goodness of spirits of turpentine may like-  
 wise be ascertained by noticing the degree of  
 inflammability it possesses; the most inflam-  
 mable is to be preferred. Those who are  
 their good or bad qualities, for good turpentine  
 has a pungent smell, the bad a very disagree-  
 able one and not so powerful. Painting,  
 when properly executed, will not present a  
 shining, smooth and glossy appearance, as if  
 formed a film or skin, but will show a fine  
 and regular grain, as if the surface were  
 natural or had received a mere stain with-  
 out destroying the texture. For woodwork,  
 before the paint is applied the surface must be  
 free from moisture of any kind, and season-  
 ed. Dampness, moisture or unseasoned  
 substances in woods, stopped in or covered  
 over with paint, will in all probability tend  
 to their destruction. The surface is then  
 free from anything which may prevent the  
 paint from becoming identified with the  
 material. Thus, in painting pine woods of  
 any kind, the resin contained in the knots  
 which appear on the surface must be neutral-  
 ized, or a bluish film will show on every knot;  
 this is done by killing the knots with two or  
 more coats of red lead ground with water  
 and mixed with size; a preparation known  
 as "patent knotting" is also very much used.  
 It is composed of shellac, naphtha and some  
 other drying agent. The heads of nails  
 having been carefully punched in, all nail  
 holes, cracks or other defects are stopped  
 and filled up with putty or wood. The sur-

face of the wood is then rubbed smooth with  
 sandpaper or pumice-stone. The number of  
 coats usually given to new woodwork is  
 four. The first or priming coat need have  
 very little, if any, of the final coloring matter  
 in it. After priming, all nail holes or other  
 superficial defects are carefully stopped up  
 before the next coat is applied. The coats  
 are laid on as the previous coats become dry,  
 which is generally in about 48 hours. The  
 paint requires renewing after every two or  
 three years, when but two coats are usually  
 required. For fine work such coat is rubbed  
 with pumice or sandpaper and well dusted  
 before the next is added.

In repainting old work all dirt is carefully  
 removed with the stopping knife and duster;  
 those places that are rough are rubbed with  
 pumice-stone, and greasy marks cleared off  
 with turpentine. New patches and decayed  
 parts are then brought forward with a coat  
 of priming, all defects stopped and made  
 good with putty, and the first coat or second  
 color proceeded with in turpentine. The  
 quality of the next coat will entirely de-  
 pend upon the manner in which it is to be  
 finished. If it is to be painted twice in oil  
 and flatted, the next coat or third color  
 should be mixed up chiefly in oil and tinted,  
 like the finishing color, to form a ground for  
 flating. The greater the shine of the ground  
 the more dead will the finishing coat or flat-  
 ting be; likewise the more dead the ground  
 the better will the finishing coat shine;  
 therefore it is the general rule that for fin-  
 ishing in oil the undercoat should be turpen-  
 tine, and for finishing flat the undercoat  
 or ground color should be oil; but it is to be  
 observed that all turpentine undercoats  
 have a little oil with them, and all oil under-  
 coats except the priming or first coat on  
 new work have a little turpentine with them.  
 When ironwork has to be painted the en-  
 gineer has a very different task to perform.  
 Cast and wrought iron behave very differ-  
 ently under atmospheric influences, and  
 therefore require somewhat different treat-  
 ment. The decay of iron becomes very  
 marked in certain situations, and weakens  
 the metal in direct proportion to the depth  
 to which it has penetrated, and, although  
 where the metal is in quantity this is not  
 very appreciable, it really becomes so when  
 the metal is under ¼ inch in thickness. The  
 natural surface of cast iron is very much  
 harder than the interior, occasioned, no  
 doubt, by its becoming chilled or by its con-  
 taining a large quantity of silica, and affords  
 an excellent protection, but should this sur-  
 face be at all broken rust immediately  
 attacks the metal and soon destroys it. It is  
 very desirable that the casting be protected  
 as soon after it leaves the mold as possible,  
 and a priming coat of paint or oil should be  
 applied for this purpose; the other coats  
 thought requisite can be given at leisure.

The following is the process to which all  
 water-pipes should be submitted. It was  
 introduced by Dr. Smith, and is equally ap-  
 plicable to any other kind of casting that can  
 be maintained: Each casting is thoroughly  
 dressed and made clean and free from earth  
 or sand which clings to the iron in the  
 molds, hard brushes being used in finishing  
 the process to remove the loose dust. Every  
 casting must be likewise free from rust when  
 the paint is applied. If the casting cannot  
 be dipped presently after being cleaned, the  
 surface must be oiled with linseed oil to pre-  
 serve it until it is ready to be dipped; no  
 casting is on any account to be dipped after  
 rust has set in. The coal-tar pitch used as  
 a paint in this process is made from coal tar  
 distilled until the naphtha is entirely removed  
 and the material deodorized. In England it  
 is distilled until the pitch is about the con-  
 sistence of wax. The mixture of 5 or 6  
 per cent. of linseed oil is recommended by  
 Dr. Smith. Pitch which becomes hard and  
 brittle when cold will not answer for  
 this use. Pitch of the proper quality  
 having been obtained, it must be carefully  
 heated in a suitable vessel in a temperature  
 of 300° F., and must be maintained at not  
 less than this temperature during the time of  
 dipping. The material will thicken and de-  
 teriorate after a number of pieces have been  
 dipped; fresh pitch must therefore be fre-  
 quently added, and occasionally the vessel  
 must be entirely emptied of its old contents  
 and refilled with fresh pitch. The refuse  
 will be hard and brittle like common pitch,  
 and, consequently, worthless for the pur-  
 pose. Every casting must attain a tempera-  
 ture of 300° F. before being removed from  
 the vessel of hot pitch. It may then be  
 slowly removed and laid upon skids to drip.  
 In the case of water-pipes, all those of 20  
 inches diameter and upward will have to re-  
 main at least 30 minutes in the hot fluid to  
 attain this temperature. The coating, when  
 cold, should be tough and tenacious, and not  
 brittle, nor have the slightest tendency to  
 scale off.

In considering the painting of wrought  
 iron it must be noticed that when iron is  
 oxidized by heating in contact with the  
 atmosphere two or three distinct layers of  
 scale form on the surface, and, unlike the  
 skin upon cast iron, can be readily de-  
 tached, as by bending or hammering the  
 metal. The outer layer of this scale is more  
 highly oxidized than the inner, and is  
 slightly redder in tinge from the presence  
 of a variable excess of ferric oxide over  
 that contained in the inner layer. The  
 oxide occurring in the outer scale is fusible  
 only at a high temperature, is strongly mag-  
 netic and slightly metallic in luster, while  
 the inner layers are more porous, dull and  
 non-metallic in luster, less brittle and also  
 less powerfully magnetic. It will be seen  
 that the iron has a tendency to rust from  
 the moment it leaves the hammer or rolls,  
 and that the scale above described must  
 come away. One of the plans to preserve  
 the iron has been to coat it with paint when  
 still hot at the mill; and, although this  
 answers for a while, it is a very trouble-  
 some method which ironmasters cannot be  
 persuaded to adopt, and the subsequent cut-  
 ting processes to which it is submitted leave  
 many parts of the iron bare. Besides, a good  
 deal of the scale remains, and until this has  
 fallen off or been removed any painting over  
 it will be of little value. The only effectual  
 way of preparing wrought iron is to effect  
 a thorough and chemical cleansing of the  
 surface of the metal upon which the paint is  
 to be applied; that is, it must be immersed  
 for three or four hours in water containing  
 from 1 to 2 per cent. of sulphuric acid. The



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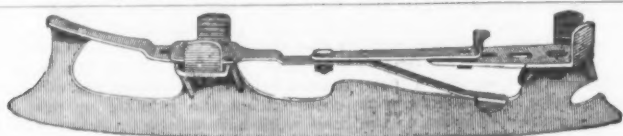
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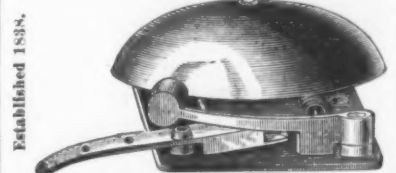
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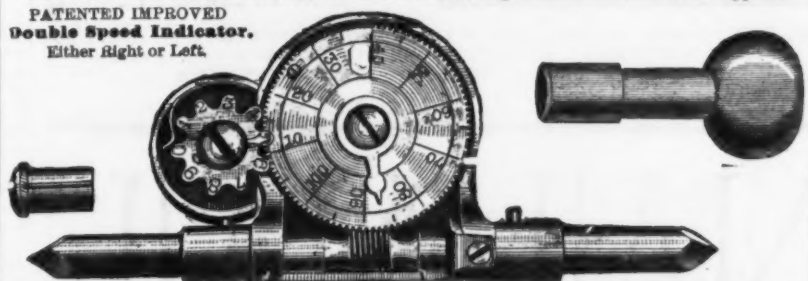
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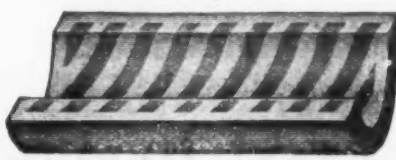
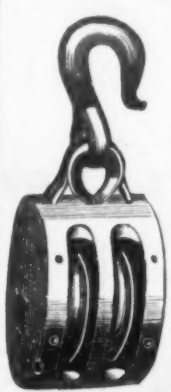
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metal is afterward rinsed in cold water, and, if necessary, scoured with sand, put again into the acid bath or pickle and then well rinsed. If it is desired to keep iron already cleaned for a short time before painting, it is necessary to preserve it in a liquor rendered alkaline by caustic lime, potash, soda or their carbonates. Treatment with caustic lime-water is, however, the cheapest and most easy method, and iron which has remained in it for some hours will not rust by a slight exposure to a damp atmosphere. Although desirable, this method of cleansing the surface is impracticable in the majority of cases, and recourse must be had to scrapers and hard brushes to remove the scale of rust. Having obtained a clean surface the question arises, What paint should be used upon iron? Bituminous paints, as well as those containing variable quantities of lead, were formerly considered as solely available, but their failure was made painfully apparent when the structures to which they were applied happened to be of magnitude, subjected to great inclemency of weather or to constant vibration. Recourse has therefore been had to iron oxide itself, and with very satisfactory results. Iron-oxide paints are made of two qualities. The first quality is the best adapted for ironwork, and is made by purifying the oxides and placing them in retorts, when the various colors are mixed with them. They are altogether submitted to seven distinct processes in the course of manufacture. To insure large surfacing qualities, or the power of covering a large area with a small quantity of paint, the ingredients should be reduced to an impalpable powder before they are mixed with the oil, and after mixture in first quality they are ground for seven or eight hours. The second quality have their colors chemically combined by mixture, and are not so carefully prepared, although they are excellent for common work. A pound of iron-oxide paint, when mixed ready for use in the proportions of two thirds oxide to one-third linseed oil, with careful work, should cover 21 square yards of sheet iron, which is more than is obtained with lead compound. Oxide of iron paint endures a very great heat without material alteration and keeps both its color and preservative qualities well. The author is of the opinion that, when used under proper supervision, no better protection can be found for iron structures than oxide or iron paints. There is this difference to be noticed between painting of iron and wood—that with the former, when a painter comes to spots of rust that cannot be removed, he should endeavor to incorporate them with the paint rather than paint over them. The repainting of iron involves carefully washing down and removing all dust, dirt, and so on, from the entire surface, every particle of rust being scraped and chipped off, the work receiving from two to four coats in oil, properly applied. The author would observe, in conclusion, that the real value of any paint depends upon the quality of linseed oil, the quality and character of the pigment, and the care bestowed on grinding and mixing, and, as all this is entirely a matter of expense, cheap paints are not to be relied upon. He is convinced that the superiority of most esteemed paints is due to the above causes rather than to any unknown process or material employed in the manufacture, and their comparatively high price corroborates this opinion.

## English Letter.

(From Our Regular Correspondent.)

LONDON, July 27, 1885.

THE WEEK  
has been noticeable for the most part for its remarkably hot weather, which has continued for the whole week in unbroken succession, with the shade temperature at from 85° to 90° in various parts of the country. For a long time past we have had no rain worth speaking of, so that we are now threatened with the usual sequence of drought in many parts of the country. As is natural, albeit extraordinary from some points of view, the rural districts are far worse off than the towns, simply because the latter have appropriated all the large water-sheds, while the villages have nothing to depend upon, as a rule, but rivers and wells. Some day we may perhaps have a system of national water supply which will at the same time enable us to avoid the floods which occur whenever we have a heavier rainfall than ordinary; meantime in this country of frequent rains (and after six or seven years of excessive wet) we are confronted with the spectacle of a water famine! This is strange, but true. As regards the cereal crops it is said that the extremely hot weather is causing the kernels of the wheat, oats, barley, &c., to dry up in an unnatural and unsatisfactory manner. They are ripening, in fact, without "body," and will not show a good yield. I fancy, nevertheless, that this drawback is chiefly noticeable on the chalky land of the southeast of England, and on very light sandy soils. On good heavy land I hear the crops are excellent in every sense, so that I hope and expect that the harvest will prove satisfactory and abundant. Cutting will be commenced a few days hence in Kent and Sussex, and by means of the reapers and sheaf-binders the whole operation will be very speedily concluded. In the "good old times" when I was a boy the harvest used to last seven or eight weeks in any given district, and was exclusively got in by the aid of the hook and sickle. Later came the scythes, which met with tremendous and riotous opposition from the Irish and English laborers. Then the scythe was superseded by the reaping machine, which is now in a fair way of being improved out of existence by the sheaf-binders. In each successive step the gain has been great to the farmers, inasmuch as the saving of time has meant the ability to take advantage of shorter periods of favorable weather and the consequent gathering of the corn in better condition. A good deal of labor has been displaced by this use of machinery, with the result that assistance is now really scarce in the midst of harvest, a fact which has rendered the sheaf-binder a decided necessity.

THE COMING ELECTIONS

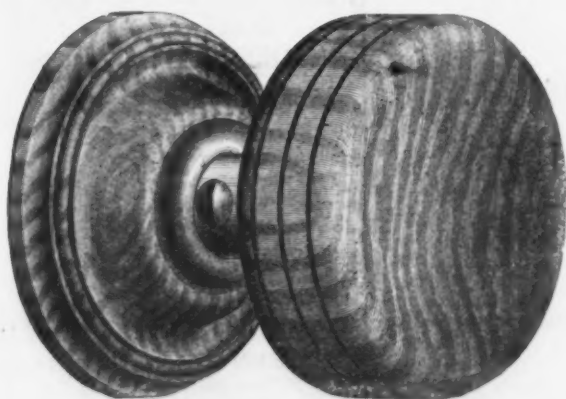
are now casting lengthy shadows before them, and there is beginning to be an

enormous amount of maneuvering among the professional wire-pullers of both parties. Each party is endeavoring to outbid the other for the Irish vote and for the stray parties, such as the local-option people, &c., who cannot possibly return their own men, but are of sufficient moment to render their votes of much importance in many of the constituencies. Mr. Parnell seems inclined to hold himself unpledged, but he has rendered some assistance to the new Conservative ministry, and they have returned the compliment by not renewing the coercion act. On the other hand, the Irish members voted against the Government the other evening, so that it would appear that Mr. Parnell has not yet received a bid sufficiently high to secure his undivided allegiance. Concurrently Mr. Chamberlain, for the Radical-Liberals, is striving for "justice to Ireland," which he interprets as being a solid vote for his party. More than ever, however, it is beginning to be seen that the great battle of the elections will in many places be fought upon the fiscal platform. The fair traders are being reinforced by the hundreds who are feeling the pinch of bad trade, and they are consequently becoming more assertive in their attitude. They are already well organized, particularly in the North of England and the Midlands, and they boast of their ability and deliberate intention of discarding the old party lines for the purpose of smiting free trade hip and thigh. In the *Quarterly Review*, an organ of recognized position, I find the following article on the subject:

"In the first place, one great influence fatal to so many ministers is at work against the party which has held power so long, and misused it so greatly—the depression of trade. The Liberals deny the existence of this depression, or understate it, and quote income-tax returns and other figures to show that the people are really better off than ever they were. Nevertheless, every man engaged in commerce knows that profits are declining, that great industries are stagnant, and that an immense reduction of wages hangs over the working classes. Employment is scarce, and trades which were prosperous a few years ago are now neglected. The 'statisticians' are as busy as ever in compiling tables and calculating 'averages,' and in dishing it into the ears of the nation that it is very rich, is growing richer every day, and that no other nation is ever likely to get abreast with it. Meanwhile the great bulk of tradesmen, the majority of artisans and a very large percentage of agricultural laborers find their profits or wages declining; and even the statisticians are driven to manipulate their figures all over again in order to explain away the distress which will insist on making itself seen and felt. Thus an elaborate calculation has recently been prepared by the 'philosophers' of the Board of Trade to show that, if prices had not fallen, we should be doing a better business than ever—though what comfort is to be derived from that 'if' no man but a figure-mystic could explain. The one thing worthy of observation in connection with this latest shuffling of the figures is that during the process it was discovered by our statisticians that the sacred totals themselves were at fault, and presented a very inaccurate picture of the facts. And yet when any rash and presumptuous interloper has dared to question these sacred totals, or to deny the soundness of the conclusions drawn from them, he has been set upon with volleys of stones and brickbats, and no words at the command of the Board of Trade have been adequate to describe his ignorance and stupidity. The time will come when all these 'calculations' and 'tabulated phenomena' will be seen to be mere impostures and delusions, and, therefore, if there are any more baronetries or other rewards to be given to the chief priests of the temple, the Liberal party have no time to lose. The hour of the public awakening cannot be very long delayed. Now what it behoves the working classes to remember, and what Conservative candidates must lose no opportunity of impressing upon their minds, is that the Liberal party can and will do nothing for them except to tell them that they cannot be poor because they are not in the work-house, and that if they are not absolutely rich it is because they persist in living too well and having too many children. That has been the burden of the song of the Radicals whenever a demand has arisen for an inquiry into the actual state of trade and the condition of the working classes. It is all that the artisans and laborers will ever get from that quarter, for the Liberals are bound hand and foot to the maintenance of the present system, while the Conservatives are free. It has already been announced that Lord Salisbury's Government will grant the Royal Commission for which the workmen of Lancashire have been vainly asking for two or three years past. Rightly, prudently and justly dealt with, this issue alone might lead the Conservatives to a great and solid victory. Let them put aside all cut-and-dried theories, and turn a deaf ear to the doctrinaires and antiquated theorists who fancy that the world has not turned round since 1846, and look closely into the veritable condition of the country, and they will see that for the first time in half a century there is a popular cause open to them if they have but the wisdom and resolution to take it up. They must not judge from what they hear or read in London, but go into the manufacturing districts, and there they will find that every Liberal who roundly refuses to make any change whatever in our commercial system is trembling for his seat. The result is that the Liberals are beginning to fence with the question or are getting ready to take it up themselves, and if the Conservatives cannot make up their mind about it, or try to play fast and loose with it much longer, the Radical caucuses will save them any further anxiety or trouble by taking it out of their hands. Nobody wants protection back again, or anything like it; but what the workmen want and mean to have is justice. 'Conversions' in the Radical ranks are now of daily occurrence, and they would be still more frequent if it were not for the fear of Mr. Gladstone and Mr. Bright. The chance is still open to the Conservatives; it cannot remain open forever. Let them lose it, and well will they

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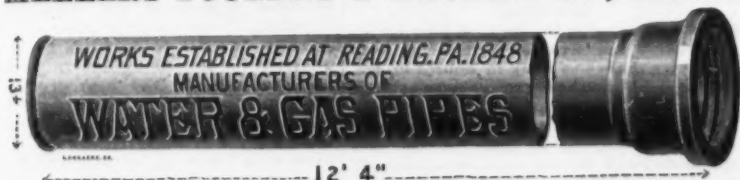
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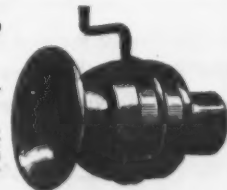


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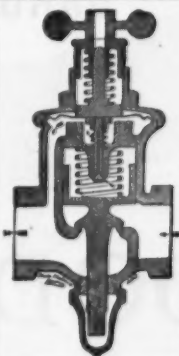
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Five complete locks  
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shows our lock when  
locked and key hole  
closed.

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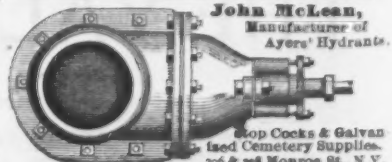
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CUTTERS', TIN, COPPER AND  
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Hawking Beetles, Hawking  
and Calking Irons; also all kinds  
of Handles, Sledge, Chisel and  
Hammer Handles. Also

### Cotton & Bale Hooks,

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combination of Hooks.  
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The best in the world.  
The knife is steel and tempered,  
and is fastened to lever with three bolts,  
and can be easily taken off to sharpen.  
The length of cut is regulated by the  
lever to which the knife is bolted.  
The higher the lever is raised, the  
longer it will cut. All are warranted.  
Circular which will be mailed FREE.  
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## "SATURN BRAND."

Circular Woven Seamless Rubber Belt.



NO SEAMS OR JOINTS.  
No Ripping or  
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ALL THE SERIOUS DEFECTS OF  
STITCHING, RIVETING &  
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Owing to its peculiar structure and elasticity,  
IT IS THE BEST BELT  
To Conform to a Flat or Crowning Pulley.  
CAUSING A  
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**THE SATURN BRAND**  
Circular Woven  
Seamless Rubber Belt  
will last longer than any other  
belt. Tensile strength, 6000  
lbs. for 6 inch wide.

It will not "break" at point  
of Lacing.

Made in Seven Sizes,  
3 in., 4 in., 5 in., 6 in., 8 in., 10 in., 12 in.

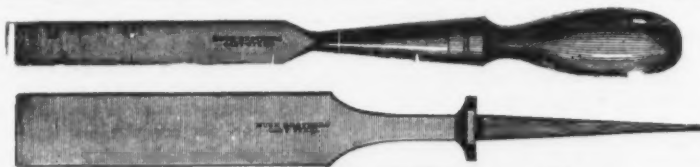
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FOR  
Bearings, Slide Valves, Cylinder Rings, Cross-  
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And all purposes where Maximum Durability, Anti-Frictional and Non-  
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**PUMP RODS,  
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Combine Toughness, Strength, Durability  
and Resistance to Corrosion.



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# DROP

**HAMMERS,  
FORGINGS and  
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deserve to be known to all future ages as the  
"stupid party."

Another paper, *Fair Play*, the organ of  
fair traders, points out that unless the  
depression be speedily relieved all wages  
must be lowered, and declares that that is  
precisely the point which the Liberals dare  
not face. Not being a partisan, I am ob-  
viously unable to foretell the future, but I am  
reasonably certain that our present system of  
free trade will receive a rough handling when  
the elections come nearer, and I shall not be  
surprised if numerous candidates pledged to  
fair trade are elected. At Sheffield, for in-  
stance two or three of the members will be  
pledged to these lines, and will certainly be  
returned. That town is by no means the  
center of the fair-trade movement, so that  
other places are also certain to vote similarly.  
Nevertheless, as I have often said before, we  
shall witness no return to protection—  
especially as applied to breadstuffs and raw  
materials.

### THE IRON MARKET

is again without especial alterations to note,  
the week having been a very quiet one in all  
directions. In some quarters it is believed  
there is a slight augmentation of the de-  
mand, but, so far as my information serves  
to show, there has been no improvement  
whatever in values. At Glasgow the re-  
sumption of operations after the local holi-  
days has been characterized by a little better  
feeling, and there has been more done in  
warrants, which closed 41/5 per ton. On the  
other hand, Scotch makers' brands have  
been flat, and some of them have declined in  
value to the extent of 6d per ton. The re-  
serve stocks are being steadily augmented,  
while the shipments are still behindhand.  
At Middleboro' the market for pig iron con-  
tinues dull, and values are unaltered on the  
basis of 32/ for No. 3 foundry. Shipments  
to the Continent are on a limited scale,  
owing to the severity of the depression in  
Belgium and Germany, while those to Scot-  
land are on a somewhat more restricted  
scale. The local consumption is fair, but not  
large. On the West Coast hematite pigs  
are without life, and prices are barely sus-  
tained at 42/6 @ 43/ for mixed lots in usual  
proportions. The cheapness of this class of  
crude iron does not seem to greatly stimulate  
the demand for it, and stocks are still grow-  
ing larger, despite the much more limited  
output than that of a year ago. In the other  
smelting districts there is more iron made  
than can be disposed of; consequently, values  
are weak, and we may expect a further vol-  
untary limitation of the make before long.  
In heavy manufactured iron and construc-  
tive ironwork there is a moderate turnover.  
Fencing wire is very quiet and much cut in  
prices by German competition. In galvan-  
ized sheets there is a good deal of work in  
hand, but open quotations are nominal, and  
individual transactions are settled between  
the parties without much reference to the  
published rates. In ordinary finished iron  
there is no animation, but at some of the bar  
and sheet mills a moderate output is being  
made, especially of sheets. As already in-  
dicated, the demand is mostly for common  
and medium sorts. Old materials are quiet  
at my late rates. Freight rates are un-  
changed at the figures given in my last two or three  
reports. Steel is in poor request at Sheffield,  
with the exception of the higher grades of  
tool and engineering crucible steel and  
special castings or forgings. The Siemens  
concerns are busy, and the Bessemer con-  
cerns are moderately, if not fully, engaged.  
Steel rails are, as before, 44/ 15/ per ton for  
ordinary heavy sections. A few small  
orders are in the market for home and for-  
eign lines, and heavier lots are believed to be  
wanted for India, but at the moment some  
of the mills are by no means fully occupied.

### SCOTCH PIG IRON

is still quiet, and in some lines a trifle  
weaker. The market is stronger, however,  
in respect of warrants, owing to speculative  
operations and despite the unfavorable  
statistics. There are now 90 furnaces  
at work in Scotland, against 94 a year  
ago. In Connal's stores, to which 2510 tons  
were added last week, there are 605,970  
tons, as against 587,691 tons a year since.  
Shipments to date are 65,087 tons in re-  
arars, while the importations into Scotland of  
Middleboro' pig are 61,988 tons ahead of  
last year. Current quotations are as under:

Deliverable alongside.	No. 1.	No. 3.
Gartsherrie, at Glasgow.....	46/6	44/
Coltness, ".....	46/	44/
Langloan, ".....	47/6	44/
Summerlee, ".....	47/	44/
Caldar, ".....	44/	44/
Carnbroe, ".....	46/	43/6
Clyde, ".....	46/3	42/3
Monkland, ".....	41/	39/
Porter, ".....	40/6	38/6
Guthrie, at Broomfield.....	41/	39/
Shotts, at Leith.....	48/	47/6
Carroll, at Grangemouth.....	51/	47/3
Kinnell, at Bo'ness.....	43/6	42/6
Glenarnock, at Ardrossan.....	46/	41/
Eglinton, ".....	41/	38/6
Dalmellington, ".....	45/	40/

### THE HARDWARE TRADES.

At Birmingham business is still held in  
check by various temporary influences, in-  
cluding the holidays, failures and apprehen-  
sions of failures, and the unsettled aspect of  
our relations with Russia. Reports of busi-  
ness in the agricultural districts of the  
eastern and northern counties are more  
satisfactory now than for a long time past,  
and the volume of trade with the seaside  
resorts of Wales, Lancashire and the South  
Coast is at its maximum. Scotland is also  
sending in excellent order sheets, but with  
Ireland trade is for the moment seriously  
affected by the failure of the Munster Bank.  
There is not much alteration this week in  
the character or extent of the Colonial  
demand, but Continental requirements in  
several lines show a satisfactory increase,  
more especially as regards France, Germany,  
Holland and the northern markets. Im-  
proved indents are arriving from the United  
States, but the gun orders for that market  
are still much under the average of recent  
years. The wrought-iron tube makers are  
still trying to restore the lost union on a  
new basis, and the galvanized bucket and  
kettle makers, whose goods are offered in  
some cases 10% under cost price, are also  
striving to effect a combination against the  
ruinous and suicidal underselling. At Wol-  
verhampton considerable inquiries are made  
for sheets and hoops, the Australian and South  
American markets being prominent buyers.  
United States inquiries for bailing-hoops are  
also better, while the Burton brewers are in

the market previous to their great annual  
brewing. Japanners, galvanizers and stamp-  
ers hope to be better employed when the  
quarter has further advanced and when  
travelers have got into full swing with the  
new patterns. Export trade, on the whole,  
is rather better than the home business.  
The colonies, India and South America are  
pretty fair buyers in several branches. At  
Sheffield the general condition of current  
business has not varied during the last week  
or two. Foreign lines have fallen, it is  
hoped and expected, to their lowest level,  
and manufacturers are looking forward to  
the next two or three weeks to bring them  
the first installments of the autumn trade.  
Meanwhile there is a marked lull in business  
circles and production is kept well in hand.

### TIN PLATES.

In London there has not been so much  
business done in these commodities since my  
last, owing to the divergent views of buyers  
and sellers. I hear of a few parcels of cokes  
having been booked since at something under  
14/6, but the majority of makers are firm  
and not disposed to take orders much below  
14/6. As a whole, the works, it is reported,  
are not booked far ahead, so it is only a  
question as to whether buyers can hold the  
bulk of their orders for a few weeks longer  
to decide the course of the market. I quote  
as last week, IC cokes, buyers, 14/; sellers,  
14/6, f.o.b. Liverpool. At Liverpool the  
firmness continues in the tin plate market,  
and there is an increase in the demand, al-  
though the advanced prices are difficult to  
obtain. For the two qualities of steel (Bes-  
semer and Siemens) there are some good  
orders to hand; 14/6 IC for ordinary Besse-  
mer and 14/9 for anything special are now  
paid for these steel cokes, while 15/ IC  
is easily had for Siemens, with the usual  
extras for crosses. Though 14/3 IC has been  
paid for ordinary kinds of coke tins, yet it is  
not a general thing, as 14/6 IC is the ruling  
figure. Many of the leading brands of coke  
tin plates are now quoted 15/ @ 15/6 IC.  
The demand for charcoal tin plates, though  
better, is not such as to send the prices up in  
the same way as the coke grades have gone  
up. There is a better demand for coke-tin  
wasters, and 13/ is easier to obtain than  
12/6 was last week and the week before.

### TRADE PUBLICATIONS.

#### A. A. Griffing Iron Company.

The A. A. Griffing Iron Company, of  
Jersey City, N. J., have issued a new illus-  
trated catalogue and price list which entirely  
supersedes former figures. The catalogue,  
which is very handsomely printed, shows  
the 1, 2, 3 and 4 iron Bundy radiators, var-  
ious sizes of circular Bundy radiators, corner,  
hot closet, dining-room, window and stair-  
way radiators, all of the Bundy type.  
Among indirect radiators they make the  
horizontal, the angle, the pin angle and  
Gold's pin radiator. Among the other  
specialties are the Bundy extended surface,  
the Thompson, the Bundy hot-water and  
direct and indirect radiators, the Geoghegan  
automatic air-valve and ball pipe hangers.  
Full-size illustrations are given, too, of the  
loops of the different types of radiators. In  
an introductory the A. A. Griffing Iron  
Company state that they have about 4,500,-  
000 feet of heating surface of the Bundy in  
use. Having found by past experience that  
most of the orders, and the most urgent  
ones, came in at a time when the manu-  
facturers were busiest, they reached the con-  
clusion that they must be able to turn out the  
bulk of a year's production in about three  
months. They have therefore enlarged their  
facilities for manufacturing until they have  
a capacity at the Jersey City works of turn-  
ing out 15,000 feet of heating surface per  
day, and have the largest foundry floor but  
one in the State of New Jersey.

#### Radial Drills.

Messrs. Hobbs, Gordon & Co., Concord,  
N. H., are sending out four-page circulars  
illustrating and describing what is known  
as the "Concord" suspended radial drill.  
The machine embraces a number of novel  
features, and the circular will no doubt be  
perused with interest.

#### General Machinery.

Messrs. Herrick & Cowell, of New Haven,  
Conn., have issued a small catalogue devoted  
to their upright and lever drills, hand lathes,  
foot-power and drop presses and other ma-  
chinery. It covers 16 pages, is illustrated  
throughout and contains many particulars of  
trade interest.

#### Power-Transmitting Machinery.

The new catalogue of the Walker Mfg.  
Co., Cleveland, Ohio, issued a short time  
ago, will no doubt prove a source of much  
desirable information to those interested in  
shafting, pulleys, hangers, &c. It is pro-  
fusely illustrated and contains extensive  
price lists and tables of dimensions, whose  
value will be readily appreciated. In addi-  
tion we find rules for determining sizes and  
speeds of pulleys or gears, and also tables  
giving the horse-power of line shafting,  
belting and gearing.

#### Centrifugal Pumping Machinery.

Catalogue No. 2, recently issued by the  
Lawrence Machine Shop, of Lawrence,  
Mass., has been enlarged and revised and  
contains a very interesting account of Mr.  
Webber's centrifugal pumping machinery,  
suitable explanatory diagrams being intro-  
duced where necessary. In addition the  
catalogue supplies particulars of general  
trade interest, such as price lists, tables of  
dimensions and illustrations of the different  
combinations of pumps and engines turned  
out.

#### Engineering Specialties.

Mr. A. Aller, 103 Liberty Street, New  
York, has issued an interesting collection  
of cards devoted to his engineering special-  
ties. We find in all 16, devoted to as many  
different devices and giving illustrations and  
price lists. They will no doubt be exam-  
ined with a good deal of interest and profit  
by steam users generally.



# The Iron Age

AND  
Metallurgical Review.

New York, Thursday, August 13, 1885.

DAVID WILLIAMS, Publisher and Proprietor.  
JAMES C. BAYLES, Editor.  
JOHN S. KING, Business Manager.  
CHAS. KIRCHHOFF, JR., Associate Editor.

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## THE IRON AGE INDEX.

The Index to Volume XXV, January to June, 1885, is now ready, and will be sent to all subscribers who desire it. Early application is requested.

### The Stocks of Pig Iron.

Two statements recently published as to the condition of the pig-iron industry of the country on July 1 are of more than usual importance, and furnish the basis for some interesting deductions. These are the usual quarterly report of *The Iron Age* as to the condition and capacities of the blast furnaces of the country, and the half-yearly statement of production and stocks published by the American Iron and Steel Association. Combining certain portions of these two statements into one table, we have the following showing as to the furnaces in blast, capacities and stocks on July 1, 1885:

Condition of the Blast Furnaces of the United States, July 1, 1885, with Capacities and Stocks.

Fuel.	Number of furnaces in blast.	Total weekly gross tons.	Total stocks, gross tons.
Anthracite.....	81	30,444	123,740
Bituminous.....	96	30,409	273,428
Charcoal.....	50	7,592	287,491

\* This is the statement of the Western Pig Iron Association.

It will, of course, be understood that all of the stocks are not at the furnaces in blast. For example, according to the monthly stock report of Mr. Joseph D. Weeks, secretary of the Western Pig Iron Association, there are stocks at many of the bituminous furnaces other than those in blast. On the basis of the above table it will appear that the stocks of iron at the anthracite furnaces are equal to the production of the anthracite furnaces in blast July 1 for a little over six weeks; the bituminous stocks were 5.4 weeks' make of the bituminous furnaces in blast, and the charcoal stocks equal to nearly 29 weeks' make. Of itself this does not seem a very large margin of stocks. The charcoal stocks appear enormous compared with the make, but when the methods of work at charcoal furnaces are considered it is not an excessive proportion. It is, of course, understood that

the figures of the American Iron and Steel Association's report only give the pig iron unsold. The actual stocks are somewhat larger, as some furnaces have iron on the bank that is sold, but not delivered. Just what this amount is, is not known. The report of the Western Pig Iron Association, before referred to, which aims to give all the stock at the furnaces, makes the amount of bituminous iron, July 1, 321,869 gross tons, with about 20,000 tons more in hands of brokers, a total of 341,869 tons, or 68,431 tons more than the statement of the Iron and Steel Association. But even this would not be an excessive supply, being only about six weeks' work of the bituminous furnaces in blast. The bituminous stocks are held chiefly in Pittsburgh and the Mahoning and Shenango valleys, nearly half of the total stock being in these three districts.

Compared with the make of iron for the first six months of the present year the stocks of anthracite irons were 19½ per cent. of the production; the bituminous, 23½ per cent., and the charcoal, 133 per cent. For furnaces situated convenient to market, as are most of the anthracite and bituminous furnaces at which the large stocks are held, these proportions seem large, especially when compared with those at the same date in the past. For example, the stocks July 1, 1884, as compared with the make of the first six months of 1884, are: Anthracite, 21½ per cent.; bituminous, 14 per cent.; charcoal, 90 per cent. In regard to these stocks, and especially as to the increase in bituminous stocks, it is to be noted, first, that under the conditions of trade now ruling a much larger proportion of stocks is carried by the producer than by the consumer. This is a feature not only of the pig-iron business, but of all others. Consumers will not buy and store in advance of their wants at such times as these, so that the stocks of "unsold pig iron," which are those given by the Iron and Steel Association, added to the stocks sold and belonging to the consumer, are on the whole, we believe, not much in excess of the normal stock. We are aware, of course, that though this may be so it does not decrease the anxiety of the furnacemen to sell or the disinclination of the consumer to buy, and while such stocks are at the furnaces they will have a depressing effect on the market. Then, in the second place, it should be noted that the chief increase in stocks is in the West and in those regions in which strikes have been in progress. It could be readily shown that the increase is not in excess of the decreased consumption of the mills by reason of these strikes and the decreased buying in anticipation of their advent. It is well known that a furnace cannot stop producing with as little trouble as a mill. Quite a number of furnaces have stopped work during the past month or will soon do so. The Isabella, the Shearman and the Ohio are examples; but, as a rule, if a furnace is in blast and the lining is at all worn, it is much better to keep blowing than to run the risk of utterly destroying the lining by blowing out.

### Financial and Commercial Recovery in the Argentine Republic.

Since February last, when we noticed editorially the Argentine financial crisis, the gold premium rose to over 160, but has since declined to 129, the Government having succeeded in negotiating a 5 per cent. loan in London for £3,400,000, to run 37 years, superseding the Morgan, Banque de Paris and Baring loans of last year, now withdrawn. These concerns have jointly undertaken to float the new loan, the sinking fund and the payment of coupons being secured by the daily customs' receipts, to be deposited with the National Bank. The new syndicate has already paid the Government £1,800,000 on account, advanced at 6 per cent. interest till the loan is placed in the open market, when this amount will be deducted. The financial crisis has so far done little mischief in the way of failures, and will gradually be overcome with the aid of the above loan, unless there should be serious political trouble during the Presidential campaign, now commenced. Business has meanwhile got into better shape; the import during the first five months has been \$31,421,075 worth of merchandise, against \$28,889,894 during the corresponding time of 1884, and the export of products \$34,814,755, against \$29,322,797. The steamer and passenger movement has been as follows:

Five months	Steamers.	Cabin passengers.	Immigrants.
of 1884 ...	206	10,546	31,328
of 1885 ...	223	11,308	55,200
Increase	17	862	23,872

The wool clip just ended furnished for export 283,000 bales, against 254,000 last year. An American steamship company is in treaty with the Government for placing on the line between Buenos Ayres and Rio some first-class steamers, thus bringing about steam communication between the Argentine Republic and the United States, from which an increased import of American manufactures into that country may be expected. Even without a steamship line the amount of domestic goods exported from this country to the Argentine Republic in 1884 was \$5,258,414, against \$4,295,409 in 1883; the import into the United States of Argentine products was \$4,009,080, against \$5,046,853, the decrease being due to the decline in value of Argentine produce, not to smaller shipments in bulk. Meanwhile the International Exhibition of Agricultural

Products and Machinery is to open in Buenos Ayres on April 25 next. There are to be five groups, divided into 44 departments and 421 sections, the whole embracing: 1, cattle, horses and sheep; 2, cereals and commercial plants; 3, machinery and implements; 4, products from stock farms, flocks and herds; 5, models and plans. The manager and president of the exhibition will be Mr. E. Sundblad, and his secretary, Mr. J. Lacroze. Congress subsidizes the exhibition with the sum of \$80,000.

The Province of Santa Fé alone imported from abroad last year \$1,161,824 worth of agricultural machinery, and the Provinces of Buenos Ayres, Entrerios and Tucuman imported agricultural and sugar machinery on a scale proportionately as large. For 20 years past considerable amounts of agricultural machines and tools have gone from this country to Buenos Ayres, mowers and reapers in particular, and now sugar mills and vacuum pans such as we ship to Cuba, Porto Rico and St. Domingo are becoming an important article, without speaking of rolling stock for the many railway lines in course of construction, 1000 miles of which will be built with American capital. Some 10 years since the Argentine Republic for the first time seriously went into agricultural pursuits, and soon not only raised enough wheat, barley and linseed for its own consumption, but has become an exporter to the extent of some 100,000 tons of such products. Now sugar planting begins to prosper, and a vast milling industry is being reared, so that Argentine flour begins to make its appearance in the Brazilian markets alongside of American and Hungarian.

A hundred thousand tillers of the soil now land annually from the Mediterranean. A country so constituted, under the guidance of energetic men like General Roca, cannot help prospering. It is true the expansion in the way of railroads and harbor improvements has of late years been too fast, expenditure in that direction perhaps too lavish, but the facility with which the Government, in the midst of a financial crisis of the severest kind, has procured from the Barings and Morgans a heavy loan, as we have stated, proves that leading bankers place confidence in the future of the country. In April the railway between Mendoza and San Juan was inaugurated, and this Andine line—which is to connect the Republic with the no less enterprising Republic of Chili—will at no distant day form a link between the Atlantic and Pacific across the Andes. The Argentine Republic, while thus establishing communication with Chili across the Southern continent, has just undertaken an expedition to the Gran Chaco. In June this expedition left, composed of a complete staff of engineers and telegraph officers, on board of three steamers and several sailing craft, ascending the Paraguay River to between the twentieth and twenty-first degree of Southern latitude, there to found the city of Pacheco and build a road through the Indian country to the Bolivian city of Sucre. The commander of the expedition is the engineer in chief, Don Miguel Arana. The purpose of this expedition is to establish a highway, and eventually build a railroad which is to give Bolivia an outlet for trade to the Atlantic, since, by taking Cobiya, Chili shut out Bolivia from the Pacific. Paraguay will also reap benefit from this Argentine enterprise. Since 1881 the claim of the Argentine Republic to that part of Patagonia east of the Andes has been conceded by all nations. Most of the regions which the expeditions sent out by the Government within the past two years have explored have been utterly unknown until the present time. They have never been approached from the Pacific. The inhospitable Atlantic seaboard gave no inkling of the better land within, and the wide plains on the north, from which the hostile Indian tribes have just been driven, made Patagonia almost inaccessible to explorers from that direction. The Argentine expeditions have now penetrated nearly half-way to Terra del Fuego, and they intend to push on to Magellan Strait and to come into effective possession of a great region, from which, they assert, the Republic is destined, through colonization, to derive great benefits. From all this it is evident that the southern extremity of this continent is in good hands, and that whatever is calculated to foster and extend our commerce with those regions must be availed of. Hence the new steamship line alluded to, as well as the Buenos Ayres exhibition, are of direct practical interest to our merchants and manufacturers.

The recent performance of the steam yacht Stiletto, running at the rate of about 23.7 miles per hour, has given special prominence to the Herreshoff type of boiler, and will perhaps have the effect of bringing about closer examination of its merits and defects, with the ultimate result of turning out a more satisfactory form of steam generator. As the matter now stands, the Herreshoff boiler, though embracing several desirable features, still offers room for improvement. Rapid raising of steam, safety from disastrous explosions, ease of repairs and several other points may be cited in its favor, but, on the other hand, its successful management demands unceasing vigilance and a high degree of competency on the part of the attendants. Even then difficulties with the valves of the circulating pump and irregularity of working, with the attending danger of burning some of the coils of the boiler, are not uncommon, and have in actual practice been experienced over and over again. With the clearly apparent promise, however, of

results much to be desired, changes will no doubt be effected in the future, producing a boiler whose value, convenience and high efficiency for certain classes of work will stand unequalled.

### Restriction of Production by Agreement.

Our friends on the other side of the water, notwithstanding it is the belief of many of them that such methods are contrary to all the "broad principles" of political economy, appear to have been more successful in their attempts to restrict by agreement the production, and thereby maintain the price, of certain forms of iron than we have in this country. The restriction of pig-iron production in England, especially in the Cleveland district, has been in operation rather more than three years, and has not been without its effect in keeping stocks reduced and preventing the too rapid decrease of prices. The pool in steel rails between the English and Continental makers has been in operation more than a year, and was so satisfactory that it has been renewed. These are conspicuous examples of pools and restrictions, and their success has led other branches of the iron trade to consider the advisability of similar agreements, and in some cases to perfect them. The cause set forth for such action, and the arguments used, are precisely those that have become so familiar in this country. The German manufacturers of rolled iron have lately entered into a combination of this character. In a circular issued they say, in substance, that they agree unanimously that present prices do not leave any profit, even in those cases where the appliances are of the best and latest type. This is the direct consequence of the sharp competition which the German iron works are carrying on against one another. With the view of diminishing the cost of production, almost all of them in the past decade improved and enlarged their working arrangements. A natural consequence was that production soon surpassed the demand and caused a rapid decline in prices. An improvement in this state of things, they argue, can only be brought about on the one hand by a sudden increase of the demand, and on the other by a restriction of production. As there is no reason to look for such a sudden increase in the consumption, the only alternative is a corresponding restriction in production. In order to achieve this object in the best way possible, it is proposed to work from 9 to 10 equal shifts every week instead of 12, as has been the rule hitherto. In this way the decrease of the production would be from 17 to 25 per cent., and the promoters are so hopeful of success that they think it possible to compensate the laborers for the reduced number of shifts from the increased receipts. It would be necessary for the realization of this project that all works without exception should combine, and that a committee should be appointed with the right of carrying out the requisite details.

It will be noticed that the conditions, so far as they are set forth in the circular from which the above summary is made, are precisely those obtaining in this country—overproduction, the result largely of an attempt to reduce cost by increasing facilities. If the conditions as to kind of product and markets are the same in Germany as in this country, it is questionable if this attempt will be a success. Though it has often been discussed, we believe it is a fact that rolling mills, as such, have not undertaken to restrict nail mills and rail mills; possibly pipe mills and those making structural iron have met with some success, but we think rolling mills in the general rolled-iron trade have not. The demand for certain of their products was such as to make it obligatory to run, though the demand for all products might not be sufficient to keep the entire mill employed. This fact, which is a notable one, indicates the direction in which attempts to restrict production and maintain prices may be successful. It is in those establishments in which the product is one thing, though of different sizes. The difficulty of successful restriction is in proportion to the variety of products. Blast furnaces, exclusively rail, nail, hoop, sheet and beam mills might unite to restrict production with some probability of success, because each kind of mill makes but one thing and practically of the same quality; but in general rolling mills, cutlery works and such establishments where the product is not only varied, but where by reason of skill, patents or other causes the same article in two works may in many cases vary greatly, not only in quality, but in character, it is well-nigh impossible to successfully adopt this method.

One of the latest movements in England promises, if it is undertaken, to be successful. We refer to the tin-plate makers' attempt at restriction. At a recent meeting of their association in Swansea, 32 works were represented, at which the following resolution was unanimously carried:

That, as signatures for the required number of three-fourths of the mills are now made up, with a prospect of more being obtained, it is decided that the requirements of the agreement shall be carried out, that it shall come into force on Monday, the 6th inst., and that the first stop week shall be from Monday, July 30, to Saturday, July 25.

The agreement provides that the mills shall also cease work at 4 p. m. on Saturdays and not start before 6 a. m. on Mondays. It is further provided that no new mill shall be started, nor any mill that has been idle since the 31st of December last re-

started. The penalty for breaking the agreement is £500 per mill, and a committee was appointed to see that the terms of the agreement were carried out. Should this result be reached, it will have a marked effect upon the price of tin plates. All of these efforts will be watched with interest on this side, as out of them may grow some methods that will enable American manufacturers to more successfully restrict their production by agreement.

### The Inconsistency of Strikes.

The inconsistency of the reasons advanced for strikes and lockouts involving questions of rates of wages, when such reasons are examined in the light of the actions or methods of the strikers or employers, is really surprising. Employers demand a reduction in wages, or refuse to consider an advance, usually on the ground that the price received for the product justifies them in such demand or refusal—that, in fact, they cannot afford to pay more. On the other hand, employees refuse to concede a reduction, or demand an advance, on the ground that they believe that their employers can afford to pay the price they ask, and that they cannot afford to work for any less. Now, these reasons are perfectly legitimate and cogent ones, viewed by themselves, provided they are facts. Each side, if it is honest, believes its demands to be just, and the facts to be as it asserts. But here the absurdity comes in. In almost all strikes or lockouts of any moment each side immediately acts in direct opposition to its expressed belief. If the employee cannot accept reduced wages, or demands increased wages because he feels he must have them, still less can he afford to be entirely idle and have no earnings; if the employer cannot afford to pay the existing wages, or those demanded in case of an increase, still less can he afford to operate his mill for a few men, who may or may not be the best of workmen, producing goods at a cost far in excess of what that cost would be were he to continue in operation and pay the wages asked by the men.

We understand, of course, what the answer to this objection will be, viz.: that the action taken by either employer or employee has reference not to the present, but to the future. The employee submits to a temporary idleness to secure the rates he demands for the future; he suffers a present evil for a future good; and his employer would answer in the same way. There can also be no doubt that a stubbornly contested strike makes both sides less eager to enter upon such struggles in the future, and thereby lessens the frequency of their occurrence. But this course of reasoning fails to convince us that the future gain compensates for the loss—that the gain in the reduction of labor cost by the employer compensates for the extra cost of attempting to run the mill short-handed, or that the experience as to the cost of strikes is sufficient to prevent their recurrence.

We believe that it still holds good in the great majority of cases that the methods of strikes and lockouts are absurdly inconsistent with the reasons advanced for entering upon them, and that there is rarely anything gained by their continuance. Take, for instance, the recent strike in the West. After the workmen had conceded 10 per cent. reduction, the difference between the manufacturers and the men on bar iron was half a cent on 63 cents to the roller, and half a cent on the same amount—63 cents—to the heater—that is, 1 cent on \$1.26, or not quite 1% of 1 per cent. on the wages per ton. The strike resulted in an idleness of about three weeks. Now, how many weeks must the rollers and heaters work to make up the wages lost during the strike? On the basis of an output of 40 tons a week, it would take the heater a little over seven years' steady work to make up at a half a cent a ton increase what he lost during the three weeks of idleness. A similar loss can be shown in connection with those mills that during a strike attempt to run in opposition to the wishes of the strikers, but expecting at the same time to accept the results of the contest, whatever they may be. There is some reason in the attempt of a mill, for example, to run non-union during a strike, provided it is the intention of that mill to continue as a non-union mill when the strike is over; but nothing is gained, either in influence upon the strikers at the time or influence for the future, by a mill running at great expense during the continuance of a strike and then deliberately accepting its results and restoring to their places the strikers when the strike is over. Under the latter circumstances the only wise thing to do is to shut the mill up and make no attempt to run.

The Etna Standard Mill, at Wheeling, have adopted the proper course. They have discharged their force and shut up their mills, and say in effect: "At the present prices we cannot run and will not run." But if while saying they could not run at the present prices they should start up their mill and attempt to make sheet iron at a high cost of labor and materials, every turn of the wheels would give the lie to their profession. Nothing so discourages and demoralizes workmen in the midst of a strike as absolute quietness about a mill. It is uncanny, mysterious; there are no grounds upon which they can base their views as to the future. But with the manufacturer making every effort to run, the indications to the men are one of two things: either that his statements to the men as to his in-



ability to run are false, or that he has orders at such remunerative figures as to compel him to run. In either case the result is the same—the men are encouraged and the strike prolonged.

### Imports During the Fiscal Years 1884 and 1885.

The Bureau of Statistics has issued its June statement, thus completing the details of the fiscal year. The following are the figures returned for iron and steel and their manufactures:

	1885.	1884.
ore, iron, gross tons.....	425,870	553,806
Pig iron, gross tons.....	151,959	283,172
Scrap, fit only to be remanufactured:		
Iron, wrought and cast, gross tons.....	19,840	46,506
Steel, gross tons.....	4,318	8,060
Bar iron, rolled or hammered, gross tons.....	32,756	38,586
Bars, railway:		
Of iron, gross tons.....	36	587
Of steel, or in part of steel, gross tons.....	4,177	7,384
Cotton ties, or hoops for baling purposes, of iron and steel, gross tons.....	17,006	15,655
Hoop, band and scroll iron, gross tons.....	336	142
Hoops, bands, strips, sheets and plates of steel, gross tons.....	1,074	1,753
Ingot, blooms, slabs, billets and bars of steel, in forms n. e. s., gross tons.....	19,015	22,432
Sheet, plate and taggers iron, gross tons.....	6,053	8,244
Tin plates,terne plates or taggers tin, gross tons.....	226,408	286,739
Wire rods (rivet, screw, nail and fence), round, in coils and loops, of iron or steel, gross tons.....	111,853	82,943
Wire and wire rope and strand, iron or steel, gross tons.....	1,736	3,181
Manufactures of, n. e. s.:		
Anvils, axes and forgings, of iron or steel, gross tons.....	611	1,090
Chains of iron or steel, gross tons.....	620	1,164
Cutlery.....	\$1,483,587	\$1,917,900
Files, file blanks, rasps and floats.....	48,498	40,810
Firearms.....	1,169,292	1,355,335
Machinery.....	961,651	1,231,843
Needles.....	334,499	371,989
All other.....	1,705,712	2,419,916

The total value of the imports of iron and steel has fallen off from \$41,473,699 in the fiscal year 1884 to \$34,563,674 in 1885. In these large sums tin plates alone figure with \$18,182,637 and \$16,665,739 respectively. With the exception of some minor items there is a gradual falling off, always excluding wire rods, which came in in considerably heavier quantity. It is well known, however, that during the current year this business has fallen away considerably. Small quantities of foreign iron and steel are re-exported. The only item in which this movement is of any significance is in steel rails, of which 29,040 tons were exported in the fiscal year 1884 and 3150 gross tons in 1885.

Among the other articles of interest to the trade the quantities imported were as follows:

	1885.	1884.
Crude asphaltum, gross tons.....	16,816	32,177
Pumblum, gross tons.....	5,504	7,237
Tin, gross tons.....	11,980	13,007
Bituminous coal, gross tons.....	817,600	820,366
Fine copper ore, gross tons.....	1,597	1,009
Pigs, old copper, gross tons.....	215	159
Spelter, gross tons.....	1,605	2,394
Brass and manufactures.....	\$424,787	\$486,737
Manufactures of copper.....	908,847	848,159
Lead and manufactures.....	486,436	141,784
Bronze manufactures.....	647,054	704,592
Manufactures of zinc.....	64,290	40,518
All other metals and manufactures.....	1,484,007	1,513,337

The re-exports are unimportant except in the case of lead and manufactures of lead, which, it will be noted, are exceptional in the above table is showing a heavy increase. In this case the re-exports grew from \$35,119 in the fiscal year 1884 to \$375,099 in 1885. The bulk of the foreign lead imported is re-exported as solder for petroleum and fruit and meat cans. It will be noted that, generally speaking, there has been a slight decline in the quantities and values of the foreign metal goods imported. Considering the fact that the raw material is as cheap here, and the manufacturing facilities abundant and excellent, it is not flattering to the enterprise of our producers that they should allow such large quantities of goods in which copper is a principal constituent to enter our markets.

Turning to the exports of domestic merchandise, we have the following data:

	1885.	1884.
Copper ore, gross tons.....	41,615	19,307
Copper ore, value.....	\$4,739,601	\$2,930,895
Copper ingots, net tons.....	22,337	8,469
Copper ingots, value.....	\$5,328,093	\$2,305,279
Three-powers.....	\$36,558	\$38,682
Mowers and reapers and parts of.....	\$1,348,232	\$2,096,298
Plows and cultivators.....	\$352,787	\$352,304
All other agricultural implements.....	\$834,150	\$995,543
Brass, manufactures of.....	\$598,118	\$801,014
Iron and Steel and Manufactures of—Values.		
Iron ore.....	\$12,891	\$12,081
Pig iron.....	102,888	96,255
Bar iron.....	43,605	73,432
Band, hoop and scroll iron.....	7,705	9,101
Car wheels.....	92,698	120,153
Castings, n. e. s.....	389,179	371,693
Cutlery.....	91,290	103,127
Firearms.....	1,700,655	1,266,831
Ingot, bars and rods of steel.....	15,674	22,738
Locks, hinges and other builders' hardware.....	1,156,654	920,283
Machinery.....	8,794,795	5,256,431
Nails and spikes.....	246,353	306,625
Plates and sheets:		
Of iron.....	31,764	27,581
Of steel.....	3,803	8,046
Printing presses, and parts of.....	177,111	208,465
Railroad bars or rails:		
Of iron.....	42,284	31,545
Of steel.....	306,401	119,284
Saws and tools.....	1,108,474	1,350,448
Scales and balances.....	273,951	384,865
Sewing machines and parts of.....	2,898,698	3,552,814
Steam engines and parts of.....		
Fire engines.....	19,134	15,235
Locomotive engines.....	732,433	2,319,946
Stationary engines.....	137,675	171,040
Boilers and parts of engines.....	199,035	361,907
Stoves and ranges and parts of.....	309,302	207,120

Wire.....	\$242,948	\$358,366
All other manufactures of iron and steel.....	2,670,134	3,796,000
Railroad cars.....	369,053	1,444,039
Plated ware.....	509,378	469,702

The most striking increase is, of course, in copper and copper ore, the value of the exports of which, in spite of the heavy decline, is now more than \$10,000,000 per annum. In railroad supplies and in general and special machinery there has been a falling off which is very heavy in some instances. On the other hand, it is gratifying to note the improvement in firearms and in hardware. In agricultural implements there is a serious decline in mowers and reapers. Taking the showing as a whole, it is by no means brilliant.

### The Forced Draft Problem.

Recent experiments conducted at the Brooklyn Navy Yard to test the effect of a screw propeller for producing forced draft have yielded some very striking results, and seem to indicate that a practicable solution of the forced-draft problem has at length been obtained. The trials were made with the boiler in the foundry of the steam engineering department, and showed that with natural draft and the full grate surface of the boiler—24 square feet—a ratio of heating to grate surface of 23.87 to 1, and a calorimeter through the tubes of about one-seventh per grate surface, the mean of 15 experiments of 16 hours each gave a consumption of 15.417 pounds of coal per hour per square foot of grate with clean fires forced to a maximum. With a screw in operation in the chimney, the mean of 10 experiments, averaging 16 hours each, gave a combustion of 17.917 pounds per square foot of grate, with 0.39 of 1 per cent. less water evaporated per pound of coal, but with a total evaporation of about one-sixth more. In a second series of experiments, in which the area of the grate was reduced to 13½ square feet, giving a ratio of heating surface to grate of 42.44 to 1, and a calorimeter through the tubes of about one-fourth the grate surface, the maximum consumption with natural draft was 19 pounds of coal per square foot of grate per hour. With the screw at work and the same proportion of boiler a combustion of 38.44 pounds was obtained with an evaporation of 0.777 pound of water less per pound of coal than with natural draft. The rate of combustion, however, was more than doubled, and the quantity of steam generated per unit of time was 80 per cent. more in the latter case.

Comparison of the figures thus obtained can leave little doubt as to the value of the forced draft as supplied in this particular instance, and no time should be lost in taking advantage of benefits so clearly demonstrated. The experiments have shown that boilers can be fitted with an appliance that will double their power in cases of emergency, without in any way interfering with the ordinary conditions of burning coal with natural draft, as it was found that the presence of the screw in the chimney did not at all affect the rate of combustion with natural draft. In comparing this system on board of vessels with that of the closed fire-room, where the pressure of air is maintained above atmospheric pressure, it would seem at first sight to be less economical, so far as power required to produce draft is concerned, since the gases generated by the combustion of coal, as well as the air supplied for combustion, must be moved by the screw in the chimney when they are highly heated, and hence have a greatly increased volume, while with a closed fire-room the air moved is of the temperature of the atmosphere. As pointed out, however, by Assistant Engineer John C. Kafer, U. S. N., in dwelling upon the subject, the volume of air moved in the case of the closed fire-room may be much greater than the volume of heated gases in the chimney, on account of the unavoidable leakage which in large fire and boiler rooms is very great. The coal bunkers also must be under pressure, as a free communication must be maintained between them and the fire-room. It is consequently not improbable that less power will be required to drive the screw than to maintain the required pressure in the fire-room. Further investigation, however, must be depended upon for more definite information on this point and to supplement the general results of the preliminary experiments.

It is announced that the Amalgamated Association has decided to take up a system of weekly reports, embracing a statement of the number of men idle and at work, and the stocks of iron, rails, &c. So far as the former is concerned, it is a perfectly legitimate inquiry, but when the representatives of the workmen undertake work of the kind mapped out in other directions they are treading on very dangerous ground indeed, because they are likely to arrive at very incorrect and misleading figures. They may succeed in getting at a fair estimate of the stocks at the mills, but it is difficult to understand how they could, without the consent of manufacturers, obtain any idea of the amounts held in store-houses, in agents' hands, &c. The natural result would be that the weekly returns would be erroneous and generally too low.

The recent gas explosions in the coal bunkers of the British war ship *Inflexible* suggest several things which might be made subjects of profitable investigation. We

find it stated, for example, that, as a rule, the coaling of British war vessels is conducted from wharf stores containing coal which has for some months been exposed to the action of the atmosphere, and has thus been caused to part with much of its gas. The *Inflexible*, on the contrary, is said to have been supplied direct from the vessel which brought the coal, and it is argued, accordingly, that this coal remained charged with an amount of gas from which stored coal has been freed and which, therefore, was responsible for the explosions. Granting this to be true, it is evident that British ships enjoy immunity from gas explosions only at the great expense of using deteriorated coal, and it is certainly remarkable to find that the British authorities have not yet discovered a more scientific and economical method of protecting their interests.

Iron manufacture in the Dominion of Canada is not prospering to the extent hoped for and expected by the promoters of the "National Policy." Mr. Frederic Nicholls, the secretary of the Ontario Manufacturers' Association, states that the probable production of pig iron in the Dominion in the year ended June 30, 1884, was 44,081 gross tons, and in the nine months ended March 31, 1885, it was 20,249 tons. Under an act of the Canadian Parliament a bounty of \$1.50 per ton is paid on all pig iron manufactured in the Dominion, and, as this bounty has been paid on the quantities above named, it is not likely that the total production was any larger. The nature of the bounty is as follows: From July 1, 1883, for three years, \$1.50 per ton will be paid on all iron produced in Canada, and \$1 per ton during the next three years. As a duty of \$2 per ton is charged on imported pig iron, the discrimination in favor of home-made pig iron is at present \$3.50 per ton. Three establishments are engaged in the manufacture of pig iron—namely, John McDougall & Co., Drummondville, Quebec; Hall, Brothers & Co., Radnor Forges, Quebec, and the Steel Company of Canada, Londonderry, Nova Scotia. Statistics of rolled iron and steel have not been collected, as there is no bureau of the Government charged with this duty, and the manufacturers are few and widely separated. Steel is made at two points in Canada—namely, at Londonderry, in the Province of Nova Scotia, and at London, in the Province of Ontario. The quantity of iron ore mined in Nova Scotia in 1884 was 54,885 gross tons, against 52,410 tons in 1883. The same Province produced 1,389,295 tons of coal in 1884, against 1,422,553 tons in 1883, and made 40,085 tons of coke in 1884, against 44,189 tons in 1883.

It is reported that the Amalgamated Association convention at Wheeling has agreed as a reduction of 10 per cent. in the sheet-rollers' scale. At the present time the report lacks absolute confirmation, but it is probably true. This was the point over which there was such a contest in June.

### METALLURGICAL NOTES.

#### A Russian Metallurgist on the Clapp-Griffiths Process.

Hermann Kinkel, of the Briansk Iron Works, Russia, writes the following letter to the editor of *Iron*:

Your issue of June 5 has just reached me, and I have read with great interest your remarks on the Clapp-Griffiths process, and the papers of Messrs. Withrow and Hunt on the same subject. As I have had considerable experience in making steel with very low carbon and silicon, and with a variable percentage of phosphorus, by the Siemens-Martin process, I take the liberty of claiming a small portion of your valuable space for a few remarks about the new process. In the years 1876-77, before the basic process was invented, a number of Russian steel works were called upon to supply large quantities of rails made from material not specially imported from abroad, and the desire of finding means to employ as a raw material the enormous stocks of old iron rails (Welsh, Cleveland and Belgian) spread over the country was very strong. Just at that time the success of several works in France working in the same direction became known here, and gave an impulse to the efforts of the Russian works. I have myself made considerable quantities of steel into the manufacture of which Cleveland rails with 0.8 per cent. of phosphorus entered freely, and have invariably found that it was necessary to keep the carbon and silicon as low as possible, but that, when that was done, the phosphorus might reach 0.5 per cent. without making the product too brittle for rails. Of course a liberal use of ferromanganese was indispensable for making such steel, from 0.2 to 0.7 per cent. of manganese being left in the product. The rails gave every satisfaction. Nevertheless, I do not think that this metal can in any way replace puddled iron or basic steel, and for the following reasons. In the first place, it does not weld, though it can be struck together by attempting to weld it; secondly, it is treacherous after having been exposed for a lengthened period to a low heat; also it is liable to brittleness when very cold.

Being interested in finding out whether any phosphorus could be got rid of in the acid Siemens-Martin furnace, I made a few changes, in working which excess of mill-scale bricks and limestone was added toward the end of the melt. The slag was tapped off, and, in one case, by repeating this operation several times, repeatedly adding lime and oxide of iron, and keeping up an intense heat after carbon and silicon had been got rid of, the phosphorus was really reduced from 0.5 to 0.26 per cent. Another circumstance which seems to point to the conclusion that even in an acid vessel some phosphorus can be removed is this, that in certain basic

Siemens-Martin furnaces, into the construction of whose melting-chamber side walls silicious material enters pretty freely, splendid basic metal is made from pig rich in phosphorus, even when the dolomite lining is washed away and the silicon material is in contact with the charge—only the slag must be removed and the metal tapped at the right moment. It appears probable that more frequent analysis of the Clapp-Griffiths metal, which, by the way, is evidently giving satisfaction, will prove that some phosphorus is removed with the slag, especially when limestone is freely added. Nor can the detrimental effect of the lime on the acid lining of the vessel be looked upon as a great drawback, as the frequent repairing of such a small and simple converter would be amply compensated for by the cheapness of the original plant and speed of working. What I should like to know, and I believe I am not the only one, is this: Is there any technical reason why the Clapp-Griffiths vessel should not be lined with basic material? I am inclined to think that there is, and that some phosphorus must be left in the metal in order to keep it properly fluid. I suppose nobody will deny that it would be an advantage if all the phosphorus could be removed, but this can probably not be done without endangering what appears to be the beauty of the thing, viz., the ease with which such little lots of metal, deprived of silicon, are handled and cast into a number of small molds; also the cheapness of the plant.

#### Analysis of Materials and Products of the North Eastern Steel Company.

M. F. Gautier, a well-known French metallurgist, in reporting to the *Génie Civil* on a visit to the Inventors Exhibition at London, gives some analyses of the raw materials used and of the products made by the North Eastern Steel Company, at Middlesbrough, by the basic Bessemer process. The different grades of pig iron used were shown by analysis to contain:

	White.	Mottled.	Gray.
Carbon.....	3.35	3.35	3.25
Silicon.....	0.30	0.40	1.06
Sulphur.....	0.102	0.08	0.08
Phosphorus.....	2.35	2.70	2.80
Manganese.....	0.40	1.00	2.03

#### The different additions contained:

	Spiegel.	Ferro.	Silicide.
Iron.....	3.35	8.00	90.30
Manganese.....	30.50	82.00	0.30
Carbon.....	5.50	17.25	3.46
Silicon.....	0.65	1.25	2.85
Sulphur.....	0.014	0.05	0.04
Phosphorus.....	0.10	0.15	0.05

These analyses are somewhat exceptional, and their accuracy has been questioned. Thus the carbon in the ferromanganese seems extraordinarily high and the phosphorus very low. The "silicide" is certainly not so high in silicon as to warrant that special term. The following are the figures given as the chemical composition of the products:

	Before additions.	For tin plate.	For rails.
Carbon.....	trace.	0.12	0.48
Silicon.....	trace.	0.02	0.02
Sulphur.....	0.081	0.05	0.06
Phosphorus.....	0.014	0.05	0.05
Manganese.....	0.050	0.45	0.72

The same company make basic steel wire rods, the composition of which is reported as follows:

	Ordinary quality.	For telegraph wire.
Carbon.....	0.16	0.03
Silicon.....	trace.	trace.
Sulphur.....	0.05	0.08
Phosphorus.....	0.04	0.04
Manganese.....	0.42	0.22

The carbon in the telegraph-wire steel seems exceptionally low.

### The Iron Industry of Italy.

According to the *Iron Trade Exchange*, 36 mines producing iron ore were in operation in 1882. The output varied from 207,432 tons, produced by five mines at Leghorn, to 3 tons raised from two mines at Sondrio, and the gross production of 36 mines at 10 centers was 272,083 tons. There are but four groups of mines of any importance, namely: 1, Island of Elba (Leghorn); 2, Monte Argentario (Grosseto); 3, San Leone (Cagliari); 4, Mines of Upper Lombardy (Como, Brescia and Bergamo).

Elba Group.—These mines have been worked from very remote times. They belonged during the Middle Ages to and until 1815 to the Princes of Piombino, and subsequently to the Dukes of Tuscany, on whose accounts they were worked until 1851, when they were hypothecated for 30 years to a Joint Official and Financial Commission as security for a loan of 10,800,000 francs, and ultimately passed to the Italian Government, who have leased them to a permanent syndicate managed by the Bank of Rome at a royalty of 4/3 per ton, the annual output being reduced to 200,000 tons. The mines, five in number, are situated on the east side of the island. The ores include specular ore, hematite, limonite, magnetite and spathic carbonate. Sometimes the mixture of all is very intricate, but at Rio the specular ore and at Calamita magnetite predominate. The vein stuff is quartz, and the ores generally contain iron and manganese, the latter being mostly abundant at Terra Nera.

The ores occur in beds or masses, sometimes attaining a thickness of 70 to 100 feet, which are found at all levels, from the summits of the hills to the bottom of the valleys, though at times they only form a superficial crust filling up the inequalities in the rocks below. The surface surveys made before the assistance of borings was available led to the hypothesis that the ores formed an immense lenticular vein, continuing in depth. The subjacent rock is of quartzose schist, covered in places by a limestone, with which the ores are most intimately associated, as, for example, at Rio and Calamita. During 30 years preceding 1881 a total of 3,430,000 tons was raised; and in 1868 Signor Anerio estimated the available contents of the deposits at about 20,000,000 tons, distributed as follows:

Rio and Vigneria.....	8,000,000
Terra Nera.....	500,000
Rio Albano.....	6,000,000
Calamita.....	6,000,000
Total.....	20,500,000

Other authorities considered these figures to be too low, and in addition the small ore

left behind by the old miners was popularly supposed to be inexhaustible. The rapid extension of the workings between 1873 and 1878 showed, however, that in almost all cases the surface ore was soon penetrated and the barren schistose rock below reached—a discovery which alarmed the Italian Government, who were then proposing to erect large smelting works for utilizing the ore on the spot. More exact examinations of the ground were therefore made, which have resulted in the opinion that the deposits are essentially products of ferruginous thermal springs, and that the figures given above must be reduced by two-thirds:

Giving the total quantity unwrought at.....	6,050,000
The old heaps are estimated at.....	1,000,000
And the small ore recoverable from the sea in shallow water or "puceletta".....	500,000
Total.....	7,550,000

At the present output of 200,000 tons, the ore would therefore suffice for 35 years; but at the rate shown in 1880-81, namely, 403,205 tons, it would be exhausted at the end of the present century. The cost of production of the Elba ore, loaded on board ship, is from 6/6 to 7/ per ton for large mine, and 3/ to 3/6 for washed smalls from the waste; but, owing to increased difficulty, the price will probably be increased in future to about 8/.

Mines of Monte Argentario.—These are situated at the foot of the mountain of the same name adjacent to the lagoons of Orto-bello. They have been worked since 1874. The ore—containing iron, 30; manganese, 18, and carbonate of lime, 20.32 per cent.—is found in masses filling caverns in a triassic limestone. The principal deposit is about 180 meters long, and from 20 to 40 meters thick; the portion above the level of free drainage is estimated to contain about 350,000 tons. Originally the ore was worked in open cast, but subterranean mining soon became necessary, and a system of pillow working, with stalls 8 meters high and 6 meters wide, was driven, leaving side pillars of only 2 meters solid and 3 meters underfoot. In March, 1881, the mine fell in over an extent of 800 square meters, and when reopened a method of filling the excavation with waste rock as the ore is removed has been adopted, and has proved perfectly satisfactory. Owing to the friable character of the ore, the cost of working does not exceed 3/3 per ton, including the filling material.

Mines of the Island of Sardinia.—The iron-ore deposits of Sardinia are very numerous, chiefly in silurian rocks, but only one, that of San Leone, has been worked to any extent. It belongs to the Société des Acieres de la Marine (formerly the Petit Gaudet & Co.), and has produced above 280,000 tons of very high-class magnetic ore, all of which is, however, consumed in France. Several other localities are mentioned by the author, none of which could, however, deliver ores at a shipping port below 15/ or 16/ per ton.

Mines of Upper Lombardy.—The Lombard mines produce ores of many different kinds, but only the spathic carbonates are of importance. They are found in tolerably regular bedded deposits, varying from 1 foot to 2 or 3 yards thick, partly in the lower triassic schists, and partly in the schists above them. They form a belt 10 or 12 miles long and a few hundred yards wide in the mountains bordering the high valleys above Bergamo and Brescia. This is one of the classic lands of open-fire iron and steel making, and, in spite of the large quantities of ore worked in bygone ages, enough remains to make the locality one of considerable promise for the future. The cost of calcined ore from the more accessible mines is given at 15/ 16/ per ton on the Lake of Isco, while that of others less favorably situated is estimated at 24/ on the railway at Paratico and Brescia.

Smelting Works.—In 1882, 18 furnaces produced 24,778 tons of pig iron. This was entirely smelted with charcoal, one-half of the total being made at Bergamo and Brescia. In the same year 90,630 tons of wrought iron and 3450 tons of steel were produced. In the puddling furnaces the Siemens construction is preferred, because they can be heated by waste, wood, lignite or peat. The first Bessemer plant was erected in 1866. Want of fuel retards the erection of large works, except on the coast, where large blast furnaces might be operated with Elba ore and English coke. The water-power in the mountains is, however, favorable for forges, and a large establishment for the manufacture of armor plates at Terni is talked of, as it would require a transport of only 3 tons of coke and ore per ton of finished plates from Civita Vecchia to the works, representing a cost of only 20/, which might be further reduced if the coke from the local lignite made in Barelli ovens could be used.

The effect of the great strike of lumbermen on the Saginaw River, which commenced July 6, will not be an unmixed evil. The *Bay City Gazette* says: "The ill-effects of the mills on the river will leave from 200,000,000 to 400,000,000 feet of logs in the booms and in the streams, and this will to that extent at least curtail operations in the woods during the winter months, making work hard to find, and wages necessarily small, through the inevitable law of supply and demand. The effect on the lumber business, at least on prices, cannot be otherwise than beneficial for all interested therein. A curtailment of the output of lumber amounting to 400,000,000 feet cannot but affect the business of the entire country, and its effect has already been felt in different directions by an advance in prices; and if the mill men conclude to close their mills permanently, as many of them are inclined to do, the curtailment must exceed the amount named."

A dispute has arisen between the Bridgeport Water Company and the Bridgeport Paper Company regarding the ownership of a chimney which both have jointly used for many years. The paper company wish to pull down the chimney and build a larger one, and on Sunday they began to pull it down, but were restrained by an injunction signed by Judge Granger, of the Superior Court. The water company claim that they cannot afford to do without a chimney, even for a single day, as more than 40,000 people depend upon the company for a supply of water.



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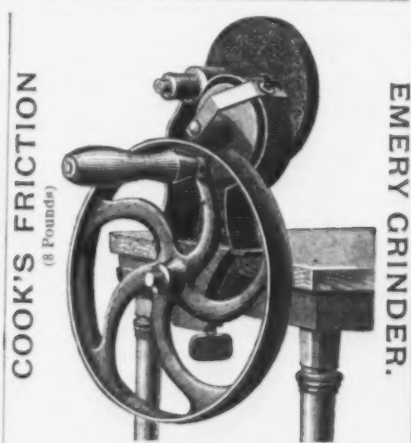
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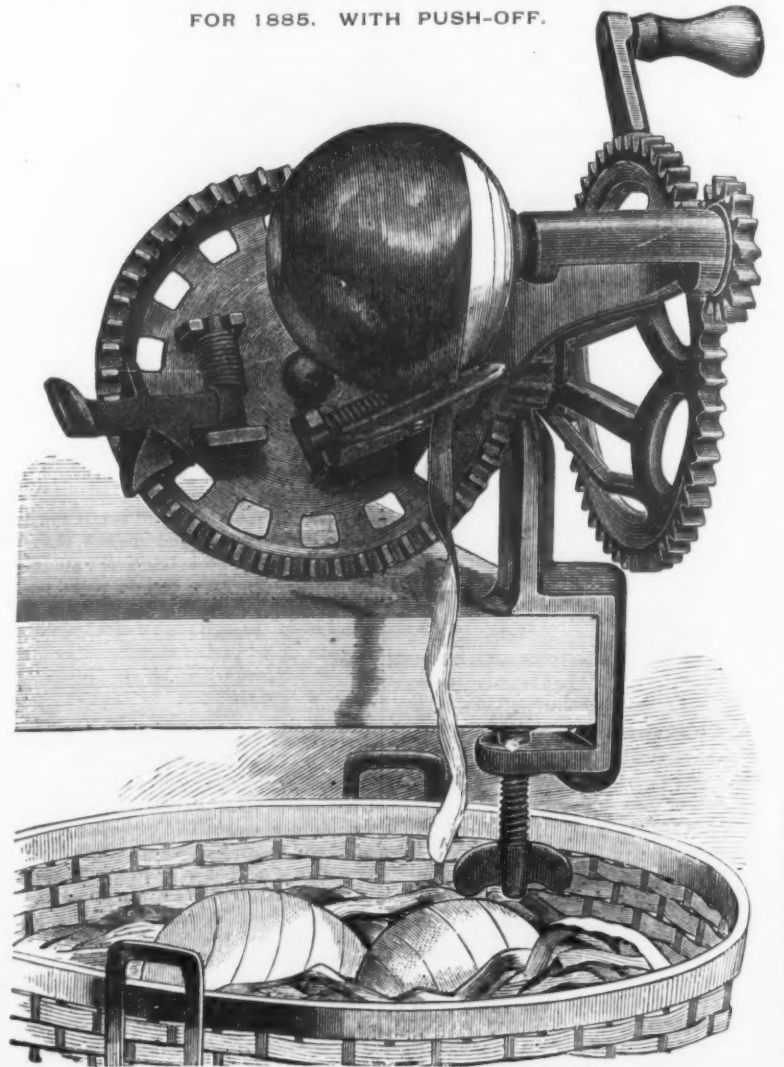
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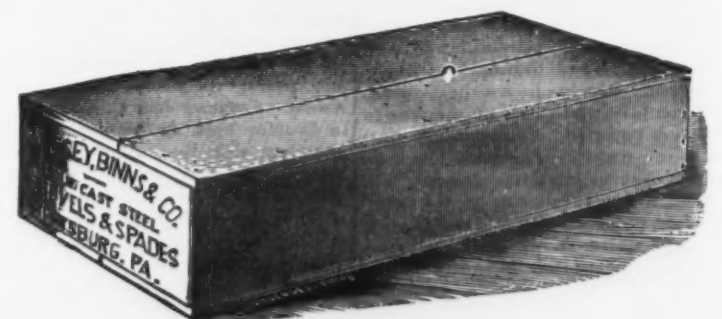
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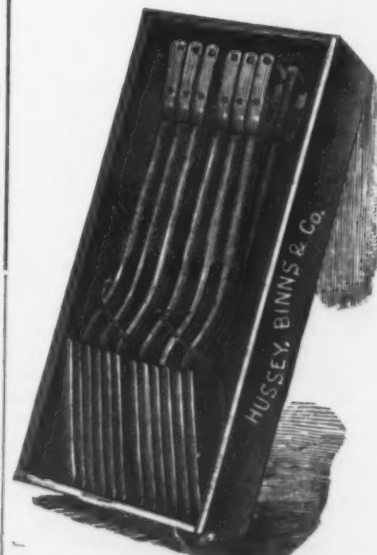
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**WANTED** a 10-inch Plunger Pump, in perfect working order, with or without Suction and Delivery Pipes. Apply

T. STRAKER,

Boonton, N. J.

## WANTED.

A second-hand BRADLEY HAMMER in good order. Give size; state where it may be seen, and bottom prices. Also two Power Drop Hammers, with lifters 200 lb. and 400 lb. or thereabouts. "B,"

Office of The Iron Age, 83 Reade St., New York.

**GALVANIZING AND TINNING.** Parties intending putting in Galvanizing or Tinning Apparatus may hear of a capable party to put in the same and give instructions in running. Address, E. IRVING,

No. 8 Canal St., Somerville, Mass.

## WANTED.

A competent Superintendent for a rolling mill where Merchant Bars and Shapes are made.

Address, "320,"

Office of The Iron Age, 83 Reade St., Phila., Pa.

**IRON, STEEL AND HEAVY HARDWARE.**—Wanted. A position as Salesman by a man who is well and favorably known to the trade in twenty States. Understands the Steel business thoroughly. Energetic and successful. Can furnish highest references as to character. Would prefer line indicated above, including Nails, Wheels, &c. Would travel for one house exclusively or represent at reduced expense, two or three concerns. Address, "IRON & STEEL,"

Office of The Iron Age, 83 Reade St., New York.

## Special Notices.

Second-Hand  
MACHINERY.

1 Engine Lathe, 22-in. swing, 20-ft. bed, with Back Face Plate for Pit work.  
1 7-ft. swing Engine Lathe, 10 ft. bet. centers.  
1 Engine Lathe, 7-ft. swing, 30 ft. bet. centers.  
14 Engine Lathes, 15 in. to 48 in. swing.  
1 Foot-Power Screw-Cutting Lathe.  
1 Foot-Power Hand Lathe.  
2 Iron Planers, 16 in. to 42 in. wide.  
1 Lincoln Milling Machine.  
12 Drilling Machines.  
2 Shaping Machines.  
4 Hand Lathes.  
1 Vertical Boring Mill.  
6 Power Presses.  
1 Screw Press.  
1 Drop Press.  
1 Set Bending Rolls.  
1 Hydraulic Wheel Press.  
5 Power Hammers.  
1 Stone Crusher.

And a large and selected stock of other miscellaneous Iron-Working Machinery.

If you are in want of anything in our line, either new or second-hand, tell us just what it is, and we will send full and detailed descriptions. Our prices are always low, and goods are all right. Machinery bought, sold or exchanged.

## Badger &amp; Stetson,

49 Dey St., New York City.

## SPECIAL NOTICE.

**NOTICE.**—M. V. Smith has no longer any connection whatever with the Tyrone Furnace Company; he has no interest in the M. V. Smith's Regenerative Gas Furnace Patents, nor any authority to use them or any improvements made to the same by him. All persons are hereby cautioned against purchasing or contracting with said M. V. Smith for the use of said patents or any part thereof. Licenses to use said Furnaces can be obtained only from the undersigned. TYRONE FURNACE CO., Tyrone, Pa. June 17th, 1885.

In view of the above notice, published in The Iron Age of July 2d, 1885, I have to say that (while the publication is correct) I severed my connection with the Tyrone Company of my own free will and accord, solely with a view of extending my business as metallurgical engineer. My practice hereafter will be to furnish plans, specifications and estimates, as well as to superintend the construction of REGENERATIVE GAS FURNACES, on which there are no valid patents, charging a reasonable fee for my work. I have had over 14 years' practical experience in the business, and am prepared to guarantee good work, as well as to protect my clients against infringements.

For further information address

M. V. SMITH,

Altoona, Pa.

## HOISTING ENGINES.

New to H. P. Cylinder, 6 in. x 8 in. (worm-gear) 16 to 21, Drum 20 in. diameter, 18 in. long. Improved Cone Friction for Hoisting and Lowering. Also Double 10 in. x 10 in. Williamson Hoister, with 450 ft. 1 in. Wire Rope. Used one month only.

A. G. BROOKS,

261 N. Third Street, Phila.

## WANTED.

By and old well established house in San Francisco, Cal., having two travelers covering the entire Pacific Coast, and thoroughly acquainted with the Hardware trade, the representation or sole agency for any appropriate line of goods from manufacturing or importing houses only. For further particulars, address

"J. K.," P. O. Box 1206, N. Y.

## WANTED.

Two second-hand Babcock & Wilcox Safety Tubular Boilers of 200 to 300 horse-power. Address "B. M.,"

P. O. Box 119, N. Y.

**A Mill Manager** of over 20 years' practical experience in making Cut Nails from Pig and Scrap Iron, &c., also spikes and all kinds of mill work in detail of millwork, machinery foundations, &c., &c., and competent to take charge of millmen. Address

"REFERENCE,"

Office of The Iron Age, 83 Reade St., New York.

## TRAVELING SALESMAN WANTED.

A man of ability, who is familiar with the Charcoal Iron trade. Address, with references, stating business experience and salary expected,

"H.,"

P. O. Box 1470, Pittsburgh, Pa.

## TO MANUFACTURERS.

The advertisers, having a good connection with the Hardware trade throughout Canada, would undertake the introduction and sale of a few good lines for Canada. Only reliable houses need apply. All information cheerfully given. Address

"P. O. BOX 687," Montreal, Canada.

## HARDWARE MAN.

Wanted to employ by the 1st of October next, a competent Hardware man for a Hardware and Agricultural house in Mississippi. Must have a good record, be unmarried and about twenty-five years of age, and willing to travel. Address

"HARDWARE," Box 21,

Office of The Iron Age, 83 Reade St., New York.

79 & 81 DUANE STREET,

NEW YORK, July 29, 1885.

Till further notice our quotation for first quality American Flat Head Iron Screws will remain

85, 10 to 10 1/2, R. & E. list, subject to terms and conditions named in our cards of June 10 and 24.

SMITH, LYON & FIELD.

## BOILER SHOP FOR RENT,

with complete equipment of power tools, in

Chicago. Will give party considerable work.

Address "OWNER,"

Office of The Iron Age, 38 Clark St., Chicago, Ill.

## NOTICE.

Large Buyers of Shafting are requested to send specification for special prices.

MERWIN MCKAIG,

Cumberland, Md.

## Special Notices.

## Engines and Boilers.

NEW AND SECOND-HAND.

The following new Slide-Valve Engines guaranteed complete and first class:

One 14 x 16. One 8 x 10.  
One 12 x 16. One 11 x 16.  
One 18 x 24. One 10 x 15.  
One 14 x 20. One 10 x 12.  
Second-hand, guaranteed in good condition:  
One Corliss Cut-off, 16 x 42.  
" " 12 x 30.  
" Wright 22 x 42.  
One Adjustable Cut-off, 16 x 48.  
" " 10 x 30.

One Safety Power Vertical Engine, 6 H. P.  
One Corliss Beam Condensing Engine, 30 x 72.  
Large stock assorted sizes new and latest improved Engines and Boilers. Come and examine our stock. Plans, estimates and specifications furnished for mills and factories, guaranteeing best results; steam engine indication; cards demonstrated for economy, &c. Send for circular.

NEWELL UNIVERSAL MILL CO.,

10 Barclay Street, New York.

## BOOKS.

## LAMBERSON'S

HARDWARE PRICE BOOK,

Pocket Edition, each \$4.00.

## DISCOUNT BOOK,

Just out. Cloth, \$2.50. Leather, \$3.00.

Send for Descriptive Circulars.

Sent, post-paid, to any address, on receipt of price by B. LAMBERSON, Portland Oregon; David Williams, 83 Reade St., N. Y.; A. F. Shapleigh & Cantwell Hdw. Co., St. Louis, Mo., or William Blair & Co., Chicago, Ill.

## FOR SALE.

THE CUTLERY MANUFACTORY AND  
MACHINERY.

formerly known as the White & Sanson Cutlery Works, at Hedge and Oxford Streets, Frankford, Philadelphia, with Patent No. 108,740, for improvement in Handles of Table Knives. Full particulars upon application to

WILLIAM L. DuBOIS, Treasurer of the Philadelphia Trust, Safe Deposit and Insurance Company, 413, 415 and 417 Chestnut St., Philadelphia.

## For Sale.

New first-class Machine Tools at very low prices, combining all the latest and best improvements: Engine Lathes with 6 and 8 foot beds, 16-inch swing.

18-inch swing, with 8, 10 and 12 foot beds.  
25-inch swing, with 12 1/2-foot beds.  
26, 27 and 28 inch swing, with 12 1/2-foot beds.  
For description, cuts and prices, address.

JOS. B. REED,

Cairo, Ill., U. S. A.

## FOR SALE AT A BARGAIN.

28 open side, 20 yard Dump Cars; one Shifting Locomotive, saddle tank, Porter. All standard gauge and in first-class order.

LINDSAY, PARVIN & CO.,

358 Walnut Street, Philadelphia.

## Wire Nail Machines.

NOTICE.

Having arranged with the Birmingham Iron Foundry, of Birmingham, Conn., to manufacture and sell my Patent Wire Nail Machines, I refer further orders and inquiries to them. Thanking the public for past favors, I am very respectfully,

FRED. H. HARDMAN.

JUNE 17, 1885.

For further particulars and prices address

BIRMINGHAM IRON FOUNDRY,

Birmingham, Conn.

## SPECIAL NOTICE.

NAPIER'S PATENT GOVERNOR OR SPEED REGULATOR.

Messrs. Napier Brothers, Engineers, Glasgow, Scotland, wish to dispose of their United States patent of November 11, 1864, for their speed Regulator and Governor, which has been so successful in Great Britain. Apply to

Messrs. NAPIER BROTHERS,

Hyde Park Street, Glasgow, Scotland.

## Cotton Gin Ribs.

HARDWARE MERCHANTS

and others furnished with materials of all kinds for making and repairing COTTON GINS, RIBS and SAWS for repairing ALL makes of gins. Send for Price List. Address THE BROWN COTTON GIN CO., Manufacturers of Cotton Gins, Feeders and Condensers, New London, Conn.

## WANTED.

I wish to buy out an established Hardware business in a good, live town.

Address "BUYER," Office of The Iron Age,

83 Reade St., New York, giving general outline of business, capital, &c.

**WANTED.**—One or two business men, with from \$25,000 to \$50,000, to take an interest in a successful Hardware Manufacturing Co. A splendid chance to the right men. Business thoroughly established in all parts of the United States and Canada, and an absolutely safe and profitable one. Is a Stock Company in good standing, with more orders from the best houses than can be filled with present facilities, and the intention is to increase the capital, build larger works and fill orders. The best of references given and required. Address

"B. P. R.,"

Office of The Iron Age, 83 Reade St., New York.

**SALESMAN** desired engagement with first-class manufacturer; thoroughly understands all branches of the Rolled Iron and Steel business; is well and favorably known to the trade West and South; would travel or take charge of branch house or local agency in Western city. Address "IRON SALESMAN," Box 41, Office of The Iron Age, 83 Reade St., New York.

**WANTED.**—A situation as Assistant Superintendent in a Rolling Mill, Open Hearth or Bessemer Steel Works, by a metallurgical Engineer, theoretically and practically trained, and who has held positions as assistant superintendent at Krupp's Steel Works, Germany, and at the Consett Iron and Steel Works, England. Address "F. R. E.," P. O. Box 208, New York City.

## Special Notices.

## AXLE MACHINERY.

A complete lot of modern Machinery for manufacturing Carriage Axles. Tools have been in use about three years. Will sell one machine, or the lot, to suit the customer; immediate delivery.

LIST:

1 Kingsley Helve Hammers.  
1 Bradley Helve Hammer, 100 lbs.  
1 14 in. x 1/2 ft. Putnam Engine Lathes.  
1 17 in. x 6 1/2 ft.  
2 Pratt & Whitney No. 4 Back Geared, Nut Tapping and Facing Machines (or Screw Machines).  
2 Pratt & Whitney Axle Threading Machines, with Turret Head.  
1 Pratt & Whitney No. 2 Milling Machine, hand feed.  
1 Wilder Bar Iron Cutter, capacity, 3/4 Square Iron.  
1 Bar Iron Cutter, capacity, 3/4 in. Square Iron.  
1 Sturtevant No. 4 Steel Pressure Blower and Counter-shaft.  
2 Reaming Machines, quick acting, excellent tools.  
2 Tumblers, 4 ft. x 2 ft.  
1 Revolving Forge.  
1 Cast Iron Forges.  
1 Platform Scale.

A large and valuable lot of small tools, fitted to above Machines, and adapted to the business. We have a full line of new machinery, and are prepared to make low quotations. We are also agent for the following firms. Write full particulars of what is wanted.

NEW YORK AGENT FOR

Brown & Sharpe Manufacturing Co.

P. Blaisdell & Co.

Powell Machine Tool Co.

Bradley's Cushman Hammer.

National Mch. Co., Bridge and Nut Mch.

Hilles & Jones, Boiler Tools.







# Trade Report.

## New York Iron Market.

**American Pig.**—The market continues to show the same features. The demand is limited to small lots for immediate consumption, and while the leading makes of No. 1 are quoted \$18, with Southern Irons at \$17, there are offers of other outside Irons at figures as low as \$16.50. No. 2 is in ample supply, and the pressure to sell is chiefly confined to this grade. Pig Iron is being offered in this market from the Shenango Valley, coming via Buffalo, the freight being \$2.10 from furnace to tidewater. We quote standard brands of Lehigh and North River Irons, tidewater delivery, nominally as follows: No. 1 X Foundry, \$17.50 @ \$18.50; No. 2 X Foundry, \$16 @ \$16.50; Gray Forge, \$15 @ \$15.50; the outside figure is asked for special brands. Outside brands sell for 50¢ @ \$1 less than our quotations.

**Scotch Pig.**—Nothing but a small business in jobbing lots is being done. Nominal quotations for 5 and 10 ton lots are as follows: Coltness, \$19.50 @ \$20 to arrive; Gartsherrie, \$19.50 to arrive; Shotts, \$19.50 @ \$20 to arrive, \$20 from yard; Carnbroe and Glengarnock, \$18.50 @ \$19 to arrive; Summerlee, \$19 @ \$19.50 to arrive; Dalmenington, \$18.50 to arrive; Eglinton, \$17.50 @ \$18 to arrive; Clyde, \$18.50 @ \$19 to arrive. Concessions are made for larger lots and for sales from dock.

**Bessemer Pig and Spiegeleisen.**—We note a sale of 5000 tons of American Bessemer Pig at private terms. In Spiegeleisen a 1000-ton lot has been placed in the West. We quote: Foreign Spiegeleisen, 20%, nominally \$25.25 @ \$25.50, 10% @ \$21.50, 45% @ \$22, 60% @ \$22, and 80% @ \$20. Foreign Bessemer is nominally \$18.50 @ \$19. A small lot has been sold at private terms.

**Bar Iron.**—A few inquiries for fair lots are on the market, but have not been placed as yet. The demand is very slow, and, while some of the mills are well supplied with orders, others are anxious sellers. We quote for delivery here in round lots: Common Iron, 1.45¢ @ 1.55¢; Medium, 1.55¢ @ 1.65¢, and Refined Iron, 1.7¢ @ 1.9¢, the lower figures being occasionally shaded. Store prices are 1.6¢ @ 1.75¢ for Common, 1.75¢ @ 1.8¢ for Medium and 1.85¢ @ 2¢ for Refined. Swedish Iron is quoted \$70 a ton, and Imported Nail Rods at \$77.50 @ \$81, ex-ship, according to quality, in large lines.

**Structural and Shaped Iron.**—Transactions are restricted to small lots. Angles may be quoted nominally 1.9¢ @ 2.1¢, delivered, for round lots, and Tees at 2.25¢ @ 2.4¢. Store quotations remain 2.2¢ @ 2.4¢ for Angles, and 2.5¢ @ 2.7¢ for Tees. American Beams and Channels are 3¢ base from dock for all orders. German and Belgian Beams are unchanged.

**Plates.**—The volume of business is limited. Usual prices for small lots of Iron Plates are as follows: Common or Tank, 2 @ 2.1¢; Refined, 2 1/2 @ 2 3/4¢; Shell, 2.4¢ @ 2 1/2¢; Flange, 3.4¢ @ 3 1/2¢; Extra Flange, 4¢ @ 4 1/4¢, with concessions for large lines. For small lots of Steel Plates the quotations are as follows: Ship, 3¢ on dock; Tank, 2 1/2¢ on dock; Boiler, 3¢ @ 3 1/4¢ for Shell, 3 1/2¢ @ 4¢ for Flange, and 4¢ @ 5 1/4¢ for Extra Flange and Fire-Box.

**Merchant Steel.**—Quotations for the range from ordinary to good grades are as follows: American Tool Steel, 7 1/2¢ @ 10¢; Tool Steel of special grades and finer qualities, 12¢ @ 20¢; Crucible Machinery, 4.5¢ @ 6¢; Spring and Tire, 2 1/2¢ @ 2 3/4¢; Open-Hearth Machinery, 2 1/4¢ @ 2 3/4¢, and Bessemer Machinery, 2¢ @ 2 1/2¢; English Tool, 13 1/2¢ @ 15 1/2¢.

**Steel Rails.**—Eastern mills have booked during the week about 25,000 to 28,000 tons of orders, chiefly for the South, though the Northwest and the East have taken round lots. Since in almost every case the price is for delivery at distant points, it is possible, in the absence of accurate data on the freight rates, to estimate only approximately the net figure at mill. It is certain, however, that in many instances \$27 at mill has been considerably shaded. Small lots have fetched \$28 at tidewater. On Tuesday the Bessemer Company, Limited, the concern which controlled the Bessemer patents now expired, and some other minor patents still in force, held a meeting at Long Branch to discuss the question of reducing the present royalty of 25¢ to a merely nominal figure. Invitations to mills not members of this company have been issued for a meeting to discuss the advisability of forming a combination to uphold higher prices. This meeting is now in progress, and reports received concerning the preliminary discussion are encouraging. While matters are pending the mills are declining to name prices. Quite a number of inquiries aggregating about 35,000 tons are in the market.

**Steel-Wire Rods.**—With the exception of one lot of 1000 tons at private terms, there have been no transactions of consequence. The tone is firmer, and inquiries, among them one for 6000 tons for delivery into next year, are a little more numerous. It is reported that a good many of the German mills have turned their attention to rolling other shapes, while those remaining, being well supplied with orders, are indifferent. The lowest quotation we hear for near-by delivery is \$40.25. We quote \$40.50 @ \$41.50.

**Wire Billets.**—Imported Basic Billets are quoted \$33 @ \$34; Basic Blooms, \$32, and Basic Sheet Slabs, \$37 @ \$38.

**Old Rails.**—There have been no transactions in this market this week.

**Old Wheels.**—We hear of a sale of 200 tons at \$14.75. There are other lots offering at a little more money, \$14.87 being asked.

**Scrap.**—Some holders decline to name lower figures than \$18 for No. 1 from yard. Buyers, however, are very scarce, and it would be impossible to place any quantity at figures approaching the nominal quotation of \$18.

**Rail Fastenings.**—The Spike association recently formed has gone to pieces. It is stated that the established price was cut soon after it had been agreed upon. We quote, nominally, 1.85¢. Quotations for large lots are 2.55¢ @ 2.65¢ for Bolts and Square Nuts; 2.75¢ @ 3¢ for Bolts and Hexagon Nuts, and 1.55¢ @ 1.7¢ for Splice Bars.

## Philadelphia.

Office of The Iron Age, 220 South Fourth St., PHILADELPHIA, AUGUST 11, 1885.

The past week has been very much broken in upon by the funeral obsequies in New York, so that anything like business activity could hardly be expected. There has been no retrogression, however, but things will soon reach a point when the extent and character of the fall trade can be pretty fairly estimated. The past two weeks were favorable, on the whole, and the trade are disposed to believe that the improvement will be maintained, and probably be increased, when everybody gets settled down to business. There were some unusual obstructions during last month, in the face of which the downward tendency in prices was checked, and for a while the possibility of some little advance began to be considered. A fresh start will be necessary, however, owing to the pause of last week, but, as already mentioned, the feeling is hopeful.

**Pig Iron.**—Is steady, but not very active. There is less urgency to sell, and unless quoted rates can be had holders are inclined to take whatever risks there may be in holding. It is reported that a considerable amount of material has been taken by Western consumers, so that some of the Alabama and other furnaces will have little or nothing to spare for the Eastern markets for some time to come. It is difficult either to confirm or deny these reports, but, in any event, there is no demand for that class of iron at present, although it could be had at about \$14 for No. 3 Gray Forge. Lehigh and other good brands are in pretty good supply, with a fair demand for No. 1 Foundry at \$17.50 @ \$18, delivered. No. 2 Foundry is in excess of current requirements, and is pressed for sale at \$16 @ \$16.50 without finding buyers except for moderate sized lots. Good Mill Irons command about \$15, delivered, although \$15.50 is the usual quotation. A retrospect of the market during the past month leads to the conclusion that there is a slightly improved feeling, and possibly a little better demand, but there is nothing tangible that can be laid hold on as certain evidence that the turning point has been reached. It seems very likely, however, that developments during the next couple of weeks will enable careful observers to determine what turn the market will take. Meanwhile a conservative policy is being followed by both buyers and sellers.

**Foreign Iron.**—There is no demand at present, and prices are entirely nominal at about \$18.50 for ordinary brands of Bessemer and \$19 @ \$20 for special brands. Spiegeleisen offered at \$25 for 20%, buyers intimating that \$24 would be about their ideas of value.

**Muck Bars.**—There is very little doing and prices show no change. The best makes are held at \$26.50 @ \$27 at mill, with lower qualities at prices in proportion.

**Blooms.**—The demand does not improve and prices are nominally unchanged, as follows: Soft Basic Blooms, \$33.50 @ \$35; Billets, \$38 @ \$39, and Siemens-Martin, \$40 @ \$42; extra quality, \$43 @ \$45; Domestic Blooms, \$30.50 @ \$32, delivered, for Nail Plate, and \$35 @ \$36 for Plate and Sheet Blooms. Charcoal Blooms, \$50 @ \$52; Run-out Anthracite, \$43 @ \$44; Scrap Blooms, \$34 @ \$35; Northern Ore Blooms, \$34.

**Bar Iron.**—There is no change of any importance. The demand may be a shade better, but is still far from being active. Some of the mills report a better inquiry and a slight gain in the volume of business, but prices are as demoralized as ever. There is no regular price for anything, so that quotations give very little idea of the market, but in a general way 1.65¢ @ 1.75¢ may be said to cover the majority of transactions. Common Bars can be had at 1.4¢, but there is a tendency to look more to quality than to price, so that the bulk of the demand is for the better grades. Skelp Iron is in fair demand at 1.75¢ for Grooved, and 2¢ @ 2.1¢ for Sheared, but prices are very irregular.

**Plate and Tank Iron.**—The demand has been chiefly for small lots, although in the aggregate a fair amount of business has been entered. There is nothing to indicate any great increase of business in the near future, although some of the mills appear to be pretty well filled up for the present. There has been sharp cutting on what are considered desirable orders, but quotations are nominally as follows: Ordinary Plate, 1.9¢ @ 2¢; Tank, 2¢ @ 2.05¢; Shell, 2.5¢;

Flange, 3.5¢; Fire-Box, 4.25¢; Steel Plates, Flange, 3.5¢ @ 3.75¢; Fire-Box, 4¢ @ 4.25¢.

**Structural Iron.**—The demand has been pretty well maintained, and, although no large orders have been entered, several of the leading mills find their capacity comfortably engaged for some time to come. Prospects continue favorable, and so far as this branch of the Iron trade is concerned there is reason to believe that a fair degree of activity will be maintained during the balance of the year. Prices about as last quoted, viz.: Bridge Plate, 2.1¢; Angles, 2¢; Tees, 2.3¢ @ 2.4¢, and Beams and Channels, 3¢.

**Sheet Iron.**—There has been more inquiry, and in some instances larger sales are reported than for some time past. From this time out it is thought that the market will be more active, as some large buyers have yet to place their orders. Prices are irregular, but for the usual run of orders rates are about as follows:

Best Refined, Nos. 26, 27 and 28..... 3 1/2¢  
Best Refined, Nos. 15 to 25..... 3 1/4¢  
Common, 1/4¢ less than the above.  
Best Bloom Sheets, Nos. 26 to 28..... 5¢  
Best Bloom Sheets, Nos. 22 to 25..... 4 1/2¢  
Best Bloom Sheets, Nos. 16 to 21..... 4¢  
Blue Annealed..... 2 1/2¢  
Best Bloom, Galvanized, discount..... 60¢  
Common, discount..... 62 1/2¢

**Wrought-Iron Pipe.**—There is a slight improvement in the demand, and the indications point to increasing activity in the near future. Discounts about as follows: Lap-Welded Black Pipe, 62 1/2 @ 65 % off list prices; Butt-Welded Black Pipe, 45 @ 47 1/2 %; Butt-Welded Galvanized, 35 @ 37 1/2 %; Lap-Welded Galvanized, 45 @ 47 1/2 %; Boiler Tubes, 57 1/2 @ 60 %.

**Nails.**—The demand is fair, although not equal to what has been anticipated. Prices are steadier, however, and at the meeting of the Eastern Nail Association, which is to be held this week, it is thought measures will be adopted which will at least lead to firm, if not higher, quotations. Meanwhile \$2.15 @ \$2.25 appears to be the usual range of prices.

**Steel Rails.**—There is a singular uniformity or monotony in reports regarding the Rail trade. The demand is fair, mills moderately full of work, and prices unchanged. Possibly something will be done to freshen up the market at the meeting which is to be held in Long Branch this week, but in the meantime there is not a single new feature to report. Manufacturers quote \$27 @ \$27.50 at mill, according to quantity, time of delivery, &c.

**Old Rails.**—There is not much doing at present, although at about \$17, Philadelphia, some good-sized lots would be taken. Holders ask \$17.50, but sales have been made at a medium figure, which is about all that the market will afford. For delivery in the interior sales have been at prices varying from \$17.75 to \$18.25. Prices rather firm for good Rails.

**Scrap Iron.**—The market is extremely dull, and quoted rates are not easily obtained unless for such material as buyers happen to be looking for. Sales reported at about the following figures: No. 1 Wrought Scrap, \$17 @ \$17.50; No. 2 do., \$12 @ \$13; Horse Shoes, \$22 @ \$23; Turnings, \$13 @ \$14; Old Car Wheels, \$13.50 @ \$14; Old Steel Rails, \$16; Fish Plates, \$22 @ \$23; Cast Scrap, \$13 @ \$13.50; do. Turnings, \$9 @ \$10.

## Pittsburgh.

Office of The Iron Age, 77 Fourth Avenue, PITTSBURGH, PA., AUGUST 11, 1885.

No material change in the business situation during the past week, although there appears to be a more hopeful feeling. Trade is more active than it was in June and the early part of July, but it is still short of what it should be. There is one thing that Pittsburgh is badly in need of, and that is a foundry for the manufacture of Cast-Iron Pipe. Thousands of tons of it are used here for water and natural gas, yet there has been none made in Pittsburgh for a number of years. There were two large Pipe foundries here, one owned by William Smith & Sons and the other by James Marshall & Co., but both these firms went under, and since they failed all the Cast-Iron Pipes used here has been the product of Philadelphia, Cincinnati and Louisville foundries. It is said that one of the natural-gas companies recently closed contracts for about 10,000 tons at Cincinnati. Of course this makes work for the railroads, but there is no good reason why this Pipe should not be made here, where there is an abundance of the raw material and plenty of labor, both common and skilled. It is rumored that a Pipe foundry is about to be established at Scottdale, Pa., and that the Charlotte Furnace Company is to be interested in the same. There is a good opening here in Pittsburgh for a Pipe foundry, and no doubt it will soon be taken advantage of. Navigation has again been resumed, and during the past week about 5,500,000 bushels of Coal were shipped down the river, mostly to Cincinnati. If the water only holds up long enough to let the boats back with their tows of empty Coal craft the river Coal trade will be in pretty good condition. The opening of the dam at Davis Island to business has been postponed until September 1. The formal opening will be celebrated in an appropriate manner, and it is probable there will be many here from a distance.

**Iron Ore.**—Continues very dull, with apparently but little prospect of any immediate improvement. Reports from Cleveland say there has been no material change in the

situation there, with the exception of increased receipts, while the shipments show no improvement. The receipts at that point last week are reported as being more than double those of the week preceding. No change in prices. Outlook for the Ore trade during the remainder of the year not very promising.

**Pig Iron.**—Commission men report but little change in the general position of the market; the demand is increasing somewhat, as is the consumption, but the supply is considerably in excess of present wants. Prices are no better, although some operators are inclined to the belief that the lowest have been reached. Certain it is that current rates afford no margin for profit to the furnacemen. The already large number of idle furnaces will probably be increased, and with a decreased production and an increasing consumption an improvement in prices may be hoped for. It is reported that some of the Rail mills are willing to contract for Bessemer Iron for future delivery at present prices. We do not think any of our city furnaces would care to contract for forward deliveries at present prices, notwithstanding the prospect is not very promising for any immediate improvement in price. We quote as follows:

No. 1 Neutral Forge..... \$14.50 @ \$14.75, 4 mos.  
No. 2 Neutral Forge..... 14.00 @ 14.25, 4 "  
All-Ore Forge..... 15.00 @ 15.50, 4 "  
White and Notched..... 13.50 @ 14.00, 4 "  
No. 1 Foundry..... 16.50 @ 17.00, 4 "  
No. 2 Foundry..... 15.00 @ 15.50, 4 "  
No. 1 Foundry..... 17.50 @ 18.50, 4 "  
No. 1 Foundry Charcoal..... 21.00 @ 22.00, 4 "  
Cold-Blast Charcoal..... 25.00 @ 27.00, 4 "  
Bessemer Iron..... 17.00 @ 17.50, 4 "

**Muck Bars.**—There have been no recent sales, in the absence of which we quote nominally at \$25.50 @ \$26.50.

**Manufactured Iron.**—For some kinds of Iron, such as Skelp, Bridge and Structural Iron, there is a very fair and increasing business, but for ordinary Merchant Iron trade continues dull, and but few of the mills making nothing but the latter are running full, some of them standing idle. There is an increasing volume of business, however, but no improvement in prices. Some manufacturers continue to refuse to sell under a 1.60¢ @ 1.70¢ base for Bars, but it is claimed that orders have been accepted as low as 1.50¢ rates, and even less, 60 days, 2 % off for cash.

**Nails.**—No change in the situation here; some of the factories have been started up by the feeders taking the place of the nailers, but without much success as yet. One factory was to have been started up in the manner indicated, but when the time came the feeders that had been engaged refused to go to work. However, the demand continues light and manufacturers are still making an effort to supply the immediate wants of customers, and in doing so are obliged to buy such sizes as they are out of from Eastern manufacturers, who are now their competitors for Western trade. We continue to quote prices at \$2.05 @ \$2.10, 60 days, 2 % off for cash. The regular monthly meeting of the Western Nail Association takes place to-morrow at Chicago.

**Wrought-Iron Pipe.**—The Pipe mills here are all fully employed, some of them pressed with orders, and prices are firm, but unchanged. Outlook encouraging for an active trade during the remainder of the year. Discounts on Black Butt-Welded Pipe, in car lots and upward, 47 1/2 %; Galvanized do., 37 1/2 %; in less than carload, 45 and 35 %; Black Lap-Welded Pipe, in car lots and upward, 65 %; Galvanized do., 47 1/2 %; less than carload, 62 1/2 and 45 %. Discount on Boiler Tubes, 60 %; Two-inch Line Pipe, 10¢ per foot, net; 2-inch Tubing, 11¢; 8-inch Dry Pipe, 15¢; 5 1/2-inch Casing, 36¢.

**Old Rails.**—In regard to Old Iron Rails reports are conflicting; it is said that sales have been made as low as \$15, yet some of the brokers say they have sold none under \$18.50, and that they can find none to sell below the last-named price—that is, for immediate delivery. For delivery 60 or 90 days sellers could probably be found at \$18. Old Steel Rails may be quoted at \$16.50 @ \$17.50, according to lengths.

**Steel.**—Some manufacturers report a slightly increased demand, but all agree that prices are no better. No change in prices. Best brands of Refined Cast Steel, 8 1/2¢; Crucible Machinery 4 1/2¢ @ 4 3/4¢; Open-Hearth and Bessemer, do., 2 1/4¢ @ 2 1/2¢; Nail Slabs unchanged at \$29 per ton.

**Steel Rails.**—Heavy sections for near-by delivery are still quoted at \$27.50 @ \$28, cash, at works, and Light sections at \$30 @ \$31. The Rail mills in operation are pretty well filled with orders, and the market here is firm at prices quoted. It is said that some of the Western roads will be on the market before long for considerable quantities, and the belief is gaining ground that prices have reached bottom and that the next change will be upward.

**Railway Track Supplies.**—Demand continues light, while prices remain unchanged, as follows: Spikes, 1.90¢, 30 days, delivered; Splice Bars, 1.60¢ @ 1.70¢; Track Bolts, 2.75¢ @ 2.85¢.

**Crop Ends.**—There have been no sales of new Steel Rail Ends reported recently, in the absence of which we quote nominally at \$18.50. Steel Bloom Ends nominal at \$17.50.

**Old Material.**—There is an increasing trade, but prices continue weak. No. 1 Wrought is still quoted at \$16 @ \$17, net, being outside figures for selected Railway; Wrought Turnings, \$12 @ \$13; Car Axles, \$23 @ \$24; Old Car Wheels, \$14.50, gross ton. Cast Boring, \$10.50 @ \$11, gross.

**Window Glass.**—Discounts remain unchanged, as follows: Double Strength, in car lots, 75 and 5 %; Single Strength, 70 and 10 %.

**Coke.**—Blast-Furnace Coke remains unchanged at \$1.20 per ton, free on cars at ovens. Trade continues only fair.

## Chattanooga.

Office of The Iron Age, Carter and Ninth Sts., CHATTANOOGA, AUGUST 10, 1885.

Business as a general thing is pursuing the even tenor of its way, with a quiet tendency to increased volume in almost all lines, especially among the manufacturers. Manufactured articles of which lumber forms the whole or the principal part are now becoming of considerable importance to this district. The cooperage company recently established here have within the last two weeks made large shipments of boards to Philadelphia, Cleveland, Ohio, and also to the West Indies. Carload shipments of furniture and wooden pumps are being made daily to Texas and the Northwest, besides filling orders nearer home. The demand from the East for wooden butter dishes now exceeds the ability of the works to supply. In sash, doors and blinds the four concerns making them are taxed to their utmost to meet the demand. The Chattanooga Plow Company, who make a specialty of Plows, Cane Mills and Evaporators, have lately increased their capital stock with the view of enlarging their works. Thus far they have been unable to respond to the orders which have lately been coming in from all parts of the South. Within the last few weeks the mill and Spike works have received such an impetus to their trade as to compel them to run their works night and day, and are now behind their orders. The situation of the Pipe works cannot be other than encouraging, though the prices are low, but, taking into consideration the low figure at which they are getting their Iron and labor, they are making money and are abundantly able to compete with any of the establishments of the United States for distant deliveries. The Lookout Mills have started up, and they have already more orders entered than they can work off for some weeks to come. Among the furnaces, we note that the Citico has put a fire in her stack and will put on blast about Wednesday. As this furnace has been thoroughly overhauled, her owners expect the best results. At Dayton one of the stacks has been lighted up with the view of drying it out, and will commence blowing probably the present week. This furnace, with the Citico, will put on the market about 1000 tons per week. The Chattanooga is expecting to blow out soon, as the lining has become very much impaired. Among the banks business has increased in the last three or four weeks about 10 per cent., and business paper is passing more freely than in the early part of the season. In taking a retrospective view of the situation and comparing it with the present, we conclude that business is surely improving. Whether prices will go higher it is hard to say, but certainly a much greater volume of business may be expected in the near future.

**Pig Iron.**—There are an increasing number of inquiries and offers for round lots of Foundry grades. The stocks that have been lying in the furnace yards are mostly cleared up, and large orders for immediate delivery could not now be placed. The furnaces do not seem disposed to make contracts for large amounts on long-term deliveries, but confine themselves to such orders as they can control at present prices. One furnace in particular has refused an offer of 50¢ per ton advance on a round lot of No. 1 Foundry for a time delivery, while in almost all other grades prices are unsettled.

**Hardware.**—Merchants who handle this line report trade good. In building material the demand, especially from the country, exceeds considerably that of any previous time during the year. Hardware men handling Agricultural Implements report increased sales, and, what is rather unusual, payments have been more prompt than in times gone by, and, should nothing occur to mar the prospects of crops, the merchants look forward to a tolerably good and fair-paying business this fall.

## Birmingham.

BIRMINGHAM, Ala., August 10, 1885.

**Pig Iron.**—Again it is almost true that the weekly record of the Iron trade here must be "nothing to record." Indeed, the Pig-Iron business was hardly ever before so uneventful as it has been for the last week. The situation is not without cheerful aspects, though, and this is especially true with reference to the paucity of transactions, for several contracts for future delivery mainly have been refused. From 60 to 90 days is as long a time as manufacturers seem willing to bind themselves for at present prices. At the same time it is true that the bulk of the shipments just now is to fill standing orders booked some time ago; but it is an encouraging fact that inquiries are more frequent and from new sources almost every day. It is worthy of note that the better part of these prospective new customers are in the East—a section with which this district expects to do a big business whenever the market improves. No. 2 Foundry still holds its conspicuous place in the sales, prices varying at most of the furnaces from \$13 to \$13.50.







# Trade Report.

## General Hardware.

There is no improvement to note in business and no new features anywhere in the general situation. Still we notice in many different quarters the evidences of a feeling that the worst is over; that prices have reached a point from which a reaction is certain, and some point in confirmation to the increasing firmness of several lines of goods. Others point to the notorious weakness of other lines as proof of the contrary. A Western correspondent writes: "Some of the traveling men try to bolster up a feeling of better times in the near future, while others do not see much brightness ahead. None are trying to place larger orders than their customers feel they want to give. However dull trade may be, when a traveling man offers fall goods at low prices, there steals over one a feeling of encouragement and momentary excitement, similar to the return of energy to the old war horse, when he again hears the thunder of a battle."

### NAILS.

The market has been quiet, generally speaking. Some of the Pennsylvania mills are still selling westward; others report that they are well supplied with orders. Nevertheless, there are some anxious sellers, and buyers show little disposition to depart from their policy of buying from hand to mouth only. Little is doing in large lots from dock, which are nominally quoted \$1.95 @ \$2.05, while Iron Nails from store are obtainable at \$2.05 @ \$2.10 for round lots, and Steel Nails, which continue scarce, at \$2.30 @ 2.35. The market in other leading cities is reported elsewhere.

### BARB WIRE.

Business continues fair for the season. Manufacturers talk in a more hopeful tone, looking forward to an improvement as the result of the Chicago meeting. They show less disposition to make concessions, and in some instances ask slightly higher figures. It should be noted, however, that instances of very low sales are reported from the West. Their significance is not as yet fully understood. It is surmised that they may have been made to force recalcitrant manufacturers. The export trade is quiet. We quote nominally per carload lots of Galvanized Four-Point Barb Wire 4.35 to 4.40 cents, and for small lots 4.50 to 4.75 cents.

### SCYTHES.

The manufacturers of Scythes, who have been a considerable time endeavoring to make a pool, have at length agreed on a basis, and, while all the details are not yet arranged, the matter is considered practically settled. Prices have been agreed on, though not yet published, but it is certain they will be considerably advanced over those of last year.

H. Knickerbacker, Ballston Spa, N. Y., gives notice that the prices of Blood's Axes and special brand Axes made by him have been advanced 50 cents per dozen. Blood's Hatchets and Tools and special brand Hatchets are advanced 5 per cent. All quotations are withdrawn.

The stiffening tendency in Augers and Bits continues. In addition to those given last week, we have the following announcement:

NEW YORK, Aug. 10, 1885.

Gentlemen: From this date all our quotations for Augers and Bits are withdrawn. All future orders will be filled at prices ruling at date of shipment. We quote at present:

Humphreysville C. S. Augers..... 60x10 5  
Humphreysville C. S. Bits..... 60x10 5  
Humphreysville C. S. Car Bits..... 50 5  
Jennings's Pattern C. S. Auger Bits..... 50 5

Very truly,  
SISE GIBSON & CO.,  
For HUMPHREYSVILLE MFG. CO.

The Reading Hardware Company, Reading, Pa., have purchased the plant of the Kempshall Mfg. Co., New Britain, Conn., consisting of Patents, Machinery and Patterns for the manufacture of Kempshall's "Model," "Gravity" and "Sweep-Spring" Sash Locks, Window-Spring Bolts, Window Springs and Spring Harness Snaps, which they are prepared to offer to the trade in quantities at special low prices.

One of our correspondents calls our attention to the fact that Cook Stoves are sold very low by the country retailer. He says: "It is hard to make three or four dollars on a Cook Stove trimmed complete, and a Stove man told me a short time ago that he knew of towns where Stoves were sold at 50 cents profit. Gasoline and Heaters are much more profitable to handle."

We have received the following, which has been signed by several jobbers, but not, so far as we are at present advised, by any of those who are recognized as leaders in the trade, or resident in the cities which are the most important centers of Hardware distribution. Indeed, it is hard to see how any man with intelligence and energy sufficient to build up or conduct a successful business in the present conditions of competition between jobbers could sign a document so silly in its argument and so far from the truth in its statements. We refrain from publishing the signatures until we have reason to believe that the list is complete:

To Hardware and Iron Manufacturers:  
The undersigned, Hardware jobbers, respectfully present their views in regard to

the publication of prices in trade papers, and request your co-operation to abolish or reform the present practice.

We believe that the interests of manufacturers and jobbers are mutual; that jobbers are necessary to the economical distribution of goods to small points; that this system of distribution cheapens instead of increases the cost of goods to retailers; and that the jobbers should be protected in a living profit for making this distribution.

We believe that the publication of prices in trade papers has been one of the prime causes in bringing about the present era of low prices, and that manufacturers and jobbers suffer alike. The lowest known price being published, it becomes accessible to the smallest dealer, who insists on buying from the jobber at that figure; the jobber presses the manufacturer, with the result that selling prices approach so near to cost that a very small margin of profit remains, and no one gains but the consumer. A cut made by any house with an overstock or needing money is immediately published broadcast. In many cases of this kind a cut made in one trade center would affect only that city, and never be heard of elsewhere, but the trade paper publication brings every distributing point into competition with the weakest or lowest priced house in the country.

This process has been followed up for years, with a continually demoralizing effect upon trade, and we think it time for an earnest protest.

The trade papers publishing these prices are dependent for their support upon the advertising patronage of the manufacturers, and we believe that a request from the latter that the damaging publication of prices be discontinued would be cheerfully complied with by the trade papers.

We therefore respectfully request manufacturers of Hardware, Iron, &c., nearly all of whom sell their goods mainly through jobbers, to unite in requesting all trade papers in the Hardware or Iron interest to discontinue the publication of prices.

We have only time for brief comment at the late hour at which we write this. The system of distributing goods through jobbers is one of the institutions of this country, and we have certainly no wish to quarrel with them. In deference to their wish to be protected, *The Iron Age* prints on the general line of goods quotations which leave the jobbers a very liberal profit on bottom prices. Of course there are some goods that are always close, but on these our quotations are no lower than their selling prices. The third paragraph of the document shows that it was written by some person who does not know what he is talking about. *The Iron Age* does not pursue the course thus described, and we know of no newspaper that does. None of them make, or assume to make, prices, and they are no more responsible for the state of the market than are the daily newspapers for the crimes and casualties that they report, or the prices of stocks and bonds on the exchanges. Prices are published in almost every trade, and it is inconsistent with the spirit of the times that it should be otherwise in the Hardware trade. Information of every kind is becoming daily more widely diffused, and no information is more imperatively needed than that which guides the merchant in his daily business. The largest and most enterprising jobbers see and accept this, and are bending their energies to selling goods at right prices to people who know what right prices are. In this competition between rival firms and trade centers many houses and localities are being left behind, and some of them cannot or will not see the real causes.

### POCKET CUTLERY AND RAZORS.

We have before us the new illustrated catalogue of the La Belle Cutlery Works, Smith, Sutton & Co., proprietors, Bridgeport, Conn. This pamphlet, which will be gladly sent to the trade on application, is very neatly and satisfactorily illustrated by cuts carefully and accurately drawn to the exact size of the goods. We print below the list of Pocket Cutlery and Razors. In the Pocket Knife list the first figure of each number shows color of handle: No. 2, cocoa or brown; No. 3, red; No. 4, black; No. 5, gray or buff; No. 6, stag. The list is arranged on black and stag numbers. Where numbers of Black Knives appear in list they are made in all colors, including stag. Of their Handles they say: "Our Handles are made of Rubberoid (patented Jan. 15, 1884), which is the strongest material ever used for Cutlery, it being impossible to crack same with the blows of a hammer. The Rubberoid handle takes a finish superior to wood, and nearly equals vulcanized rubber." They call special attention to their Camping Knife and Fork, of which they say: "The handles are made of the best brass and are heavily nickel-plated. The blades are made from choice Steel, and can be used for ordinary jack-knife, fishing, hunting or camping purposes." Their Shears are sold by the Seymour list. Their Razors they warrant perfect in every respect, and would like to receive sample orders. Concerning their manufacture, we extract the following: "Our blades are thoroughly inspected before setting them in handles, which, we believe, from information, is not done by a majority of the best-known foreign manufacturers, they relying principally on their brand to sell the goods. We are using a very choice Steel, made especially for us by our mill at Pittsburgh, and use the same Steel in all our Razors, the difference in price being difference in concaving and finish. We do not make any cheap, Flat-Ground Razors, most of which are nothing more than Cast Iron." Moore Brothers, 96 Chambers street, New York, are Southern

agents for these goods. The list prices for Pocket Cutlery and Razors are subject to the following discounts: Pocket Cutlery, 40 per cent.; Razors, 10 per cent.:

No.	Small Boy.	Price.
410, 1 Blade, Iron Lining, no Bolster.....	\$1.50	
411, 1 Blade, Iron Lining, no Bolster, with Shield.....	1.70	
412, 1 Blade, Iron Lining, Steel Bolster, with Shield.....	1.90	
413, 1 Blade, Iron Lining, Steel Bolster, with Shield.....	2.10	
420, 2 Blades, Iron Lining, no Bolster.....	2.40	
421, 2 Blades, Iron Lining, Steel Bolster, with Shield.....	2.60	
422, 2 Blades, Iron Lining, Steel Bolster, with Shield.....	2.80	
423, 2 Blades, Iron Lining, Steel Bolster, with Shield.....	3.00	
Above Knives made with Brass Lining to order. Quotations on application.		
No.	Large Boy.	Price.
4201, 2 Blades, Iron Lining, no Bolster.....	\$2.60	
4202, 2 Blades, Iron Lining, no Bolster, with Shield.....	2.80	
4203, 2 Blades, Iron Lining, Steel Bolster, with Shield.....	3.00	
4204, 2 Blades, Iron Lining, Steel Bolster, with Shield.....	3.20	
4205, 2 Blades, Iron Lining, Steel Bolster, with Shield and Cap.....	3.70	
4206, 2 Blades, Brass Lining, no Bolster, with Shield.....	3.10	
4207, 2 Blades, Brass Lining, 18 per cent. G. Silver Bolster.....	3.30	
4208, 2 Blades, Brass Lining, 18 per cent. G. Silver Bolster, with Shield.....	3.50	
4209, 2 Blades, Brass Lining, 18 per cent. G. Silver Bolster, with Shield and Cap.....	4.00	
4210, 2 Blades, Brass Lining, 18 per cent. G. Silver Bolster, with Shield and Cap.....	4.50	
Above Knives made in one blade to order only. Quotations on application.		
No.	Gentlemen's Jack.	Price.
4210, 2 Blades, Iron Lining, no Bolster.....	\$2.80	
4211, 2 Blades, Iron Lining, no Bolster, with Shield.....	3.00	
4212, 2 Blades, Iron Lining, Steel Bolster, with Shield.....	3.30	
4213, 2 Blades, Iron Lining, Steel Bolster, with Shield.....	3.40	
4214, 2 Blades, Iron Lining, Steel Bolster, with Shield and Cap.....	3.90	
4215, 2 Blades, Brass Lining, no Bolster.....	3.50	
4216, 2 Blades, Brass Lining, 18 per cent. G. Silver Bolster.....	3.70	
4217, 2 Blades, Brass Lining, 18 per cent. G. Silver Bolster, with Shield.....	4.00	
4218, 2 Blades, Brass Lining, 18 per cent. G. Silver Bolster, with Shield and Cap.....	4.50	
Above Knives made in one blade to order only. Quotations on application.		
No.	Jack Knife.	Price.
4120, 1 Blade, Iron Lining, no Bolster.....	\$2.10	
4121, 1 Blade, Iron Lining, no Bolster, with Shield.....	2.30	
4122, 1 Blade, Iron Lining, Steel Bolster.....	2.50	
4123, 1 Blade, Iron Lining, Steel Bolster, with Shield.....	2.70	
4220, 2 Blades, Iron Lining, no Bolster, with Shield.....	3.10	
4221, 2 Blades, Iron Lining, no Bolster, with Shield.....	3.30	
4222, 2 Blades, Iron Lining, Steel Bolster.....	3.50	
4223, 2 Blades, Iron Lining, Steel Bolster, with Shield.....	3.70	
4224, 2 Blades, Iron Lining, Steel Bolster, with Shield and Cap.....	4.20	
4225, 2 Blades, Brass Lining, 18 per cent. G. S. Bolster, with Shield.....	4.50	
4226, 2 Blades, Brass Lining, 18 per cent. G. S. Bolster, with Shield and Cap.....	5.00	
4227, 2 Blades, Brass Lining, Steel Bolster, with Shield.....	4.00	
4228, 2 Blades, Brass Lining, Steel Bolster, with Shield and Cap.....	4.50	
Above Knives made with Clip Blade (to order), add C to number, add 20 cents to list; made with Sheep-foot Blade (to order), add S F to number, add 20 cents to list.		
4132, 1 Blade, Iron Lining, Steel Bolster.....	2.80	
4133, 1 Blade, Iron Lining, Steel Bolster, with Shield.....	3.00	
4232, 2 Blades, Iron Lining, Steel Bolster.....	3.80	
4233, 2 Blades, Iron Lining, Steel Bolster, with Shield.....	4.00	
4234, 2 Blades, Iron Lining, Steel Bolster, with Shield and Cap.....	4.50	
4235, 2 Blades, Iron Lining, Steel Bolster, with Shield.....	4.80	
4236, 2 Blades, Brass Lining, 18 per cent. G. Silver Bolster, with Shield.....	5.30	
4237, 2 Blades, Brass Lining, 18 per cent. G. Silver Bolster, with Shield and Cap.....	5.80	
4238, 2 Blades, Brass Lining, 18 per cent. G. Silver Bolster, with Shield and Cap.....	6.30	
4239, 2 Blades, Brass Lining, 18 per cent. G. Silver Bolster (long), with Shield.....	6.80	
Above Knives made with Clip Blade (to order), add C to number, add 20 cents to list.		
4142, 1 Blade, Iron Lining, Steel Bolster.....	3.00	
4143, 1 Blade, Iron Lining, Steel Bolster, with Shield.....	3.20	
4242, 2 Blades, Iron Lining, Steel Bolster.....	4.60	
4243, 2 Blades, Iron Lining, Steel Bolster, with Shield.....	4.80	
4244, 2 Blades, Iron Lining, Steel Bolster, with Shield and Cap.....	5.30	
4245, 2 Blades, Iron Lining, Steel Bolster, (long), with Shield.....	5.80	
4246, 2 Blades, Brass Lining, 18 per cent. G. Silver Bolster, with Shield.....	6.30	
4247, 2 Blades, Brass Lining, 18 per cent. G. Silver Bolster, with Shield and Cap.....	6.80	
4248, 2 Blades, Brass Lining, 18 per cent. G. Silver Bolster, with Shield and Cap.....	7.30	
4249, 2 Blades, Brass Lining, 18 per cent. G. Silver Bolster (long), with Shield.....	7.80	
Above Knives made with Clip Blade (to order), add C to number, add 20 cents to list; made with Dagger Blade (to order), add D to number, add 50 cents to list.		
No.	Sam Barlow.	Price.
41, 1 Blade, Iron Lining, Long Steel Bolster.....	\$2.50	
42, 2 Blades, Iron Lining, Long Steel Bolster.....	3.50	
Made with Clip Blade (to order), add C to number, add 20 cents to list.		
No.	Small Handle.	Price.
4283, 2 Blades, Iron Lining, Steel Bolster, with Shield.....	\$5.30	
4284, 2 Blades, Brass Lining, 18 per cent. G. Silver Bolster, with Shield.....	6.30	
4285, 2 Blades, Iron Lining, Steel Bolster, with Shield.....	5.70	
4286, 2 Blades, Brass Lining, 18 per cent. G. Silver Bolster, with Shield.....	6.70	
No.	Bullhead.	Price.
42116, 2 Blades, Iron Lining, 2 Steel Bolsters, with Shield.....	\$5.00	
42117, 2 Blades, Brass Lining, 18 per cent. G. Silver Bolster, with Shield.....	6.30	
No.	Carpenter.	Price.
4287, 2 Blades, Iron Lining, Steel Bolster, with Shield.....	\$5.00	
4288, 2 Blades, Brass Lining, 18 per cent. G. Silver Bolster, with Shield.....	6.30	
No.	Round Back.	Price.
4290, 2 Blades, Iron Lining, Steel Bolster, with Shield.....	\$6.00	
4291, 2 Blades, Brass Lining, 18 per cent. G. Silver Bolster, with Shield.....	7.00	
No.	Gunstock.	Price.
42100, 2 Blades, Iron Lining, Steel Bolster, with Shield.....	\$7.30	
42101, 2 Blades, Brass Lining, 18 per cent. G. Silver Bolster, with Shield.....	8.50	
No.	Equal End.	Price.
42290, 2 Blades, Brass Lining, no Bolsters.....	\$3.00	
42291, 2 Blades, Brass Lining, no Bolsters, with Shield.....	3.30	
42292, 2 Blades, Brass Lining, two 18 per cent. G. S. Bolsters.....	3.60	
42293, 2 Blades, Brass Lining, two 18 per cent. G. S. Bolsters, with Shields.....	3.80	
42294, 2 Blades, Brass Lining, no Bolsters.....	3.20	
42295, 2 Blades, Brass Lining, no Bolsters, with Shield.....	3.40	

42296, 2 Blades, Brass Lining, two 18 per cent. G. S. Bolsters.....	3.80			
42297, 2 Blades, Brass Lining, two 18 per cent. G. S. Bolsters, with Shield.....	4.00			
42298, 2 Blades, Brass Lining, no Bolsters.....	3.40			
42299, 2 Blades, Brass Lining, no Bolsters, with Shield.....	3.60			
42300, 2 Blades, Brass Lining, two 18 per cent. G. S. Bolsters.....	4.00			
42301, 2 Blades, Brass Lining, two 18 per cent. G. S. Bolsters, with Shield.....	4.20			
No. Sleeve Board.....	Price.			
42347, 2 Blades, Brass Lining, no Bolsters, with Shield.....	\$5.60			
42348, 2 Blades, Brass Lining, two 18 per cent. G. S. Bolsters, with Shield.....	4.20			
No. Wharfedale Pen.....	Price.			
42350, 2 Blades, Brass Lining, no Bolsters, with Shield.....	3.20			
42351, 2 Blades, Brass Lining, two 18 per cent. G. S. Bolsters, with Shield.....	3.80			
No. Congress Pen.....	Price.			
42100, 2 Blades, Iron Lining, no Bolsters, with Shield.....	\$3.30			
42170, 2 Blades, Brass Lining, no Bolsters, with Shield.....	3.80			
42105, 2 Blades, Iron Lining, two Steel Bolsters, with Shield.....	3.60			
42175, 2 Blades, Brass Lining, two 18 per cent. G. S. Bolsters, with Shield.....	4.20			
SPECIAL SOUTHERN AND EXPORT PATTERNS.				
No. Governor.....	Price.			
62500, 2 Blades, Iron Lining, Steel Bolster, with Shield.....	\$8.00			
62501, 2 Blades, Iron Lining, Steel Bolster, with Shield and Cap.....	8.50			
62502, 2 Blades, Brass Lining, 18 per cent. G. S. Bolster, with Shield.....	9.00			
62503, 2 Blades, Iron Lining, 18 per cent. G. S. Bolster, with Shield and Cap.....	10.00			
Only No. 62502 made for stock.				
No. Dog Leg.....	Price.			
62700, 2 Blades, Iron Lining, Steel Bolsters.....	\$9.00			
62701, 2 Blades, Brass Lining, 18 per cent. G. Silver Bolster.....	10.50			
With Shield, add S to number; list 30 cents per dozen extra. Only No. 62700 made for stock.				
No. Alabama Whittier.....	Price.			
62703, 2 Blades, Iron Lining, Steel Bolster, with Shield.....	\$9.00			
62704, 2 Blades, Iron Lining, Steel Bolster, with Shield.....	9.20			
62705, 2 Blades, Brass Lining, 18 per cent. G. S. Bolster.....	10.50			
62706, 2 Blades, Brass Lining, 18 per cent. G. S. Bolster, with Shield.....	10.70			
Only No. 62703 made for stock.				
No. Texas.....	Price.			
62750, 2 Blades, Iron Lining, 3 1/2-inch, 2 Steel Bolsters, with Shield.....	\$9.00			
62751, 2 Blades, Iron Lining, 3 1/2-inch, 2 Steel Bolsters, with Shield.....	10.00			
62752, 2 Blades, Iron Lining, 3 1/2-inch, 2 Steel Bolsters, with Shield.....	11.00			
62753, 2 Blades, Iron Lining, 3 1/2-inch, 2 Steel Bolsters, with Shield.....	12.00			
Made with Brass Lining and 18 per cent. German Silver Bolsters and Shields (to order), add B to number, list \$1.50 per dozen extra.				
No. Cattle Knife.....	Price.			
63130, 3 Blades, Iron Lining, two Steel Bolsters, with Shield.....	\$4.50			
63131, 3 Blades, Brass Lining, two 18 per cent. G. S. Bolsters, with Shield.....	10.00			
Only No. 63131 made for stock.				
No. President.....	Price.			
63971, 3 Blades, Iron Lining, two Long Steel Bolsters, with Shield.....	\$10.50			
63972, 3 Blades, Brass Lining, two long 18 per cent. G. Silver Bolsters, with Shield.....	12.00			
Only No. 63972 made for stock.				
Half Concave or Hollow-Ground Razors.				
Texas Horn Handle, "not leaded," Glazed Tang, Irish Point Blade.....				
No. 100, 1 1/2-inch.....	Per dozen.....			
No. 101, 1 1/2-inch.....	6.50			
Clear Horn Handle, "not leaded," Glazed Tang, Hollow Point Blade.....				
No. 110, 1 1/2-inch.....	Per dozen.....			
No. 111, 1 1/2-inch.....	7.40			
South American Black Horn Handle, Crocus Tang, Hollow Point Blade, Etched, "Hollow Ground.".....				
No. 120, 1 1/2-inch.....	Per dozen.....			
No. 121, 1 1/2-inch.....	8.40			
Short Moustache or Corn Razors, Half Concave, list \$6.35 per dozen.				
Three-Quarter Concave or Extra Hollow-Ground Razors.				
South American Black Horn Handle, Glazed Tang, Plain Blade.....				
No. 130, 1 1/2-inch.....	131.....	132.....	133.....	134.....
Per dozen.....	\$8.30	\$8.40	\$9.00	\$10.60
South American Black Horn Handle, Crocus Tang, Blade as No. 131, Etched, "Extra Hollow Ground.".....				
No. 140, 1 1/2-inch.....	141.....	142.....	143.....	144.....
Per dozen.....	\$9.35	\$9.50	\$10.00	\$11.60
Short Moustache or Corn Razors, Three-quarter Concave, list \$6.75 per dozen.				
Full Concave Razors.				
South American Black Horn Handle, Crocus Tang, Full "English" Concave Blade, Etched, "Original Daisy Razor.".....				
No. 150, 1 1/2-inch.....	151.....	152.....	153.....	154.....
Per dozen.....	\$10.35	\$10.50	\$11.....	\$12.35
South American Black Horn Handle, Crocus Tang, Full "Hamburg" Concave Plain Blade, made especially to suit Barbers.....				
No. 160, 1 1/2-inch.....	161.....	162.....	163.....	164.....
Per dozen.....	\$13.....	\$13.35	\$15.00	\$15.75
Short Moustache or Corn Razors, Full Concave, list \$8 per dozen.				
Razor Blanks.				
Razor Blanks, Ground, and Tangs Crocussed, 1/4, 5/8 and 3/4 inch, per dozen.....				
Razor Blanks, Ground, and Tangs Crocussed, 3/4 and 1 inch, per dozen.....				
Razor Handles.				
Red Texas Horn (not leaded), all sizes, per dozen.....				
Clear Canada (leaded), all sizes, per dozen.....				
Imitation Shell (leaded), all sizes, per dozen.....				
South American Black Horn (leaded), all sizes, per dozen.....				
Imitation Stag (leaded), all sizes, per dozen.....				
White Bone, plain (leaded), all sizes, per dozen.....				
Ivory, fancy pattern (leaded), all sizes, per dozen.....				
Mother of Pearl (leaded), all sizes, per dozen.....				
Setting Blanks in handles, add 10 cents per dozen. Rivet Washers for handles, \$1.35 per ounce. Eighteen per cent. German Silver Wire (standard size), \$1 per pound. Electrotypes of any of our cuts furnished for catalogue purposes at \$1.50 each, net.				

Chicago.

Office of The Iron Age, 36 and 38 Clark St.,  
Cor. Lake St., Chicago, August 10, 1885.

Hardware.—There was no special activity in the trade last week. Jobbers are saving a fair demand for seasonal goods, with increasing inquiries for prices on stocks to be delivered later in the season. The "better-feeling" announcements that have been made recently are becoming very general and are extending into the consuming class, which has its corresponding effect on the retailer, and he in turn upon the jobber and manufacturer. These are serving to stiffen up prices and are holding the market steady at former quotations. The new price list issued by the American Screw Company advances the price on Tire Bolts, which is recognized by a portion of the trade here, while other jobbers are continuing prices formerly quoted. The demand for Heavy

## Chicago.

Office of *The Iron Age*, 36 and 38 Clark St., Cor. Lake St., Chicago, August 10, 1885.

**Hardware.**—There was no special activity in the trade last week. Jobbers are having a fair demand for reasonable goods, with increasing inquiries for prices on stocks to be delivered later in the season. The "better-feeling" announcements that have been made recently are becoming very general and are extending into the consuming class, which has its corresponding effect upon the retailer, and he in turn upon the jobber and manufacturer. These are serving to stiffen up prices and are holding the market steady at former quotations



ern No. 1, \$17.50; No. 2, \$16.50; No. 3, \$15, and Mill Iron, \$13.50 @ \$14.50. There is little or no inquiry for anything except Charcoal Irons. All other grades do not cut much figure in making a market, but are none the less firm in prices asked. It would seem as though makers of Southern Irons have found some other outlet for their stocks, as they are not making even a usual effort to sell some of the brands.

**Structural Iron.**—There is considerable activity in the market for Beams and Channels; many of the orders are urgent, and frequently result in fault-finding with manufacturers for the delay in shipments. Sales agents in this city report that several good-sized orders will be let during the week, and that one or two have been placed recently, which keeps the rolling mills full of work for the present. It is understood that prices on Structural Iron are firm on material covered by the combination, but there is reason to believe that some close figuring is done on the Cast-Iron work which goes into the building. On specifications that embrace about 1100 tons of Beams that are to be placed this week some cutting is expected on the Foundry Shapes, and it is doubtful whether the actual figures will be made known. We continue to quote: Beams and Channels, \$3.10; T-Iron, \$3; Angle Iron, \$2.50; Flitch Plates, \$2.50; Frieze Plates, \$2.70;  $\frac{1}{4}$  @  $\frac{1}{2}$ ¢ is added for delivery from stock.

**Merchant Steel.**—The market had apparently a better showing for the week. All sorts of prices are named, and particularly on cheap shapes, which range from 2¢ upward, according to the class of Steel in demand. Good authority states that prices are now so low that it would seem impossible for them to go lower, and, further, that prices which are named would not be a selling figure for more than one buyer or more than one lot at a time. Flaw Steels are quoted from 2 $\frac{3}{4}$ ¢ to 5 $\frac{1}{2}$ ¢, and Tool Steels from 7 $\frac{1}{2}$ ¢ to 9¢; Bessemer, 3¢ @ 3 $\frac{1}{4}$ ¢; Open Hearth, 2 $\frac{3}{4}$ ¢, and Crucible, 4 $\frac{1}{4}$ ¢ @ 5¢. Sled Shoe Steel is beginning to be called for more freely in small lots, but no regular prices have been announced that would cover all the different makes.

**Steel Rails.**—Quite an increased demand is reported for small lots. Mills continue to name \$29 as a nominal quotation, but rumor has it that a Western mill has offered to shade this price on a block of considerable size, which, it is said, will be placed very soon. The strike at the Joliet Mill having ended, the works are again in operation.

**Bar Iron.**—Jobbers report that they are fairly busy and trade better than it was last week. They say that they have more than ordinary indications of a steady improvement in consumption, and that manufacturers of Implements and Machinery are working themselves out of the old despondent rut in the sense that the worst has been passed. This feeling, however, extends only into an increase in small orders, and does not embrace buying for future use. The demand is increasing from factories that have been idle for some time and are now starting up, many of which had used up all their material on hand before closing down. An increased demand is also coming in from railroads who are looking toward repairing old cars, and in a general way getting ready to meet the increased demand that will be made upon them to convey to market the crops which are now pretty well assured. In looking over the field of consumption, jobbers of Bar Iron find many sources from which to draw encouragement. Prices continue to rule low—1.80¢ rates—and the only hope of relief from unremunerative figures is through increased consumption. Should the past few weeks be a forerunner of the future and continue to increase as the season advances (the mills that are now out remaining idle), an advance on the best refined grades will be a certainty. There is at the present time an abundance of Bar Iron made from Old Rails or Scrap which is being sold at exceedingly low figures, but this class of Iron is not what consumers are chiefly buying. Common Iron is quoted from store at figures ranging from 1.60¢ to 1.70¢, and from mill in large lots is shaded at least one-tenth below these figures. With reference to the starting up of the rolling mills there is so little said that one may infer they intend to remain closed indefinitely, which in the eyes of those who are running would be the most beneficial act that they could confer upon the market.

**Black Sheets.**—There has been quite a revival in the demand. Many of the low quotations which have been made by manufacturers heretofore have been withdrawn, and they are now asking as bottom price \$3 for No. 27. Nearly all the reliable mills which make a No. 1 quality of Iron are full of orders or not running at all, and therefore make no quotations at less than that figure, and frequently refuse to sell at that. The medium quality may be had at from 10¢ to 20¢ less, but the demand appears to be decidedly in favor of the better quality. Many of the jobbers are short of stock, but do not like the idea of placing orders at the prices now demanded by manufacturers. From store prices remain unchanged on a basis of \$3.20 for No. 27, which price is not satisfactory to those who have not heretofore secured their supply.

**Galvanized Iron.**—The market during the week has been very good. Jobbers report that they are selling a fair amount of Iron, but nothing rushing or large in de-

mand. All orders continue to be for small lots, but this gives a better appearance to business, with an underlying current of gradual improvement, which, it is hoped, will eventually result in a more active market. Jobbers are now quoting best quality of Juniata Iron 60¢ off, while there are brands of Juniata Iron that are selling at 60 and 5. Charcoal is quoted at 60 and 5 @ 60 and 10, according to quality.

**Scrap Iron.**—There being no change in the Scrap-Iron market, we renew our quotations for No. 1 Mill at \$13; No. 2 at \$8.50; Selected Forge, \$10.50.

**Pig Lead.**—Prices for the week have ruled very firm, with a good demand from local consumers. The scarcity of Lead has been somewhat relieved, with stocks increasing at the close of the week. Sales during the week foot up 200 tons at \$4.10 and 300 tons at \$4.12 $\frac{1}{2}$ , for August delivery. Reported sales in New York at \$4.30 have had a tendency to stiffen up values all round, and quotations now range from \$4.12 $\frac{1}{2}$  to \$4.15 asked, and \$4.10 bid, on spot Lead.

### The Manufacture of Steel Tires.

At the January meeting of the New England Railroad Club some interesting data as to the manufacture of steel tires were presented in letters from the Midvale and Standard Steel Works, and from Thomas Prosser & Son, agents in this country for Krupp's Works, from which we extract and condense as follows:

The process as described by the Midvale Steel Works consists in casting solid steel ingots of cylindrical shape, say from 12 inches to 15 inches diameter, and from 10 inches to 18 inches high, according to the weight of tire to be made. These ingots, after heating, are upset longitudinally under a hammer and a hole is punched in the center, forming what is known as a "punched bloom." This bloom is dropped on a horn or beak projecting from the side of the anvil, and by blows of the hammer is enlarged in diameter, and at the same time the flange both outside and inside is roughly formed. The resulting piece is called a "beaked bloom." The beaked bloom is then rolled on a tire mill to an exact outside diameter and almost perfectly round. These operations, in the case of ordinary tires without inside flanges, present no great difficulty; but the forming of a high, narrow flange, such as is used for the Allen paper car-wheel, and others requiring an inside flange, considerably complicates the manufacture.

After specifying the care used by them in making physical and chemical tests, and in keeping individual records by number of each tire, the Midvale Company continue: The wear of tires is caused by two kinds of friction—rolling and rubbing. It has been maintained by some authorities that, especially in the case of rails, a mild steel may show a greater resistance to wear from rolling friction than a harder one. This may be the case with tires when the load carried by the wheel is not so great as to cause the metal to flow to the edge of the tire, forming the projecting burr which is so often noticed on the driving-wheels of heavy locomotives. However that may be, it can, we think, be admitted without question that a hard material offers a greater resistance to rubbing friction than a soft one. Car-wheel tires are subjected to constant rubbing friction from the effect of the brakes on every wheel, and from the skidding of the wheels on the rails; and it would therefore appear that a hard steel should be used to give a tire satisfactory wearing qualities. The use of a hard steel will, of course, increase the chances of breakage; and this must and can be guarded against by the quality of the metal—i. e., the quality of the stock used—and the care exercised in the manufacture. The steel which the Midvale Company put into car-wheel tires will show, in a bar hammered or rolled to 1 inch square, a tensile strength of 125,000 to 135,000 pounds to the square inch, and an elongation of from 8 to 10 per cent. in a length of 8 diameters. Specimens  $\frac{1}{2}$  inch in diameter and 2 inches long between shoulders, machined out from the body of the tire in a direction tangential to the circumference, will show approximately the same results. Physical qualities such as the above certainly insure hardness and consequent good wearing properties; and experience at Midvale indicates that the quality of this metal is such that it can be used with safety.

As to the ultimate economy of the general use of steel-tired car-wheels we think there can be no doubt. What is wanted is a cheap, reliable and durable center which can outwear a number of tires, and which should be provided with a simple and effective means of holding the tire on in case of breakage. A tire  $\frac{1}{2}$  inches thick made of the metal above described should, under ordinary circumstances, make a mileage of at least 400,000 miles, and if a center were used which would outwear three or four such tires, and which would allow of the tire being easily and rapidly replaced, the cost of the center would in the long run be comparatively insignificant, and the general use of such a steel-tired wheel, both for passenger and freight car service, would, we think, be found advantageous, both as regards cost and safety.

The Standard Steel Works describe the process, with illustrations, as follows: In regard to the manufacture of the tires, all the members of the club may not be aware that they are made from a solid cylindrical-shaped ingot. This cast ingot is first thoroughly hammered on face and edge under a powerful double-acting steam hammer, taking live steam above and below, the drop of which weighs 26,000 pounds, under which it is also punched. From this shape it is beaked on the horn of the anvil into the tire blank, which is really a forged tire with metal enough to allow for rolling to size wanted. This is taken to the heating furnace at the mill and then rolled to the dimensions specified. A roll inside the tire is the pressure roll, which, by hydraulic pressure, forces the tire against the main roll until the required thickness is obtained. The two

side rolls are simply guide rolls preserving the roundness of the tire. The process of manufacture, it will be understood, produces a continuous solid ring of steel without weld or joint of any sort. The method of applying the tires to the different makes of wheels varies with each wheel, and, in fact, constitutes the difference between them. Undoubtedly the wheel-makers will present the claims of their wheels to the club, and will explain the application of the tires much more clearly than we could. In regard to the question about the hardness of the steel, the grade of steel which has been adopted for driving-wheel tires is that which the results of service and a proper regard for safety have shown to be best, and this method of determination is the one which should govern the selection of steel for car-wheels, the difference in diameters, of course, insuring a greater safety in the use of hard steel in car-wheel tires. As the comparative durability and strength of cast-iron and steel-tired wheels can only be determined by actual test in service, we feel that the gentlemen having the mileage records in charge are the ones best prepared to speak on that subject. In the manufacture of tires the preparation of the bloom for rolling is the most important part, viz.: The hammering from the ingot to the bloom. The rolling is simple and only requires such a mill as shown, driven by powerful engines. The mill shown is a common, but not the very latest, type.

Messrs. Thomas Prosser & Son, agents for the famous Krupp Works, say: As you are aware, two qualities of steel are generally used for car-wheel tires, viz., crucible and open-hearth, the former being melted in small crucibles containing about 70 pounds each, while the latter is made in large masses in the Siemens-Martin furnace. After considerable experimenting and study on the subject, Mr. Krupp finds that one of the essential features of a car-wheel tire is that it shall be hard and tough, and he has settled on formulae which he considers produce the best crucible and open-hearth material for the purpose. All car-wheel tires furnished by him are made to these formulae, so that those of a given quality are necessarily of the same degree of hardness, regardless of what may be the material of car-wheel center. As regards the application of the tire to the several kinds of wheel centers before the public, Mr. Krupp is of the opinion that in some cases the method employed is very injurious to the tire, especially in the case of a connection being accomplished by casting an iron center into the tire, thereby destroying certain properties of the tire, and for this reason he has declined to furnish tires to be attached to centers in this way. As regards the relative strength of steel-tired and chilled-iron wheels, much, of course, depends on the quality of both. The tensile strain, however, of Krupp's crucible tire is about 130,000, and his open-hearth about 85,000, while the tensile strain of many of the chilled wheels running is no doubt an unknown quantity, owing to the vast number of so-called "cheap" wheels that have been put to service, but if we give them the benefit of the doubt, and call the U. S. standard 20,000 pounds per square inch tensile strength, that strength in our estimation demonstrates that the chilled wheel is a very dangerous article to put under the average passenger car of to-day (it might have been different 10 years ago with the light cars), owing to the fact that they are not suitable to carry the vast weight above their capacity that they now do, it having been pretty well demonstrated that under heavy cars the chilled wheels are not worn out in the literal sense, but are "crushed" out of service.

**Analyses of Castle Dome Pig Iron.**—Messrs. W. R. Hart & Co., of Philadelphia, call attention to the following determinations of phosphorus in Castle pig iron made by Messrs. Booth, Garrett & Blair, and covering the production for the last few weeks. These assays were made to confirm the daily reports of their own chemist, which for some time past have steadily averaged below 0.03 per cent phosphorus:

Analysis.	Phosphorus.	Analysis.	Phosphorus.
No. 1.....	0.027%	No. 7.....	0.029%
No. 2.....	0.028%	No. 8.....	0.027%
No. 3.....	0.027%	No. 9.....	0.029%
No. 4.....	0.028%	No. 10.....	0.030%
No. 5.....	0.031%	No. 11.....	0.027%
No. 6.....	0.031%		

The average of sulphur in these samples is 0.032 per cent. In silicon about one-half is  $\frac{1}{2}$  to 2 per cent, and one-half 2 to 2 $\frac{1}{2}$  per cent.

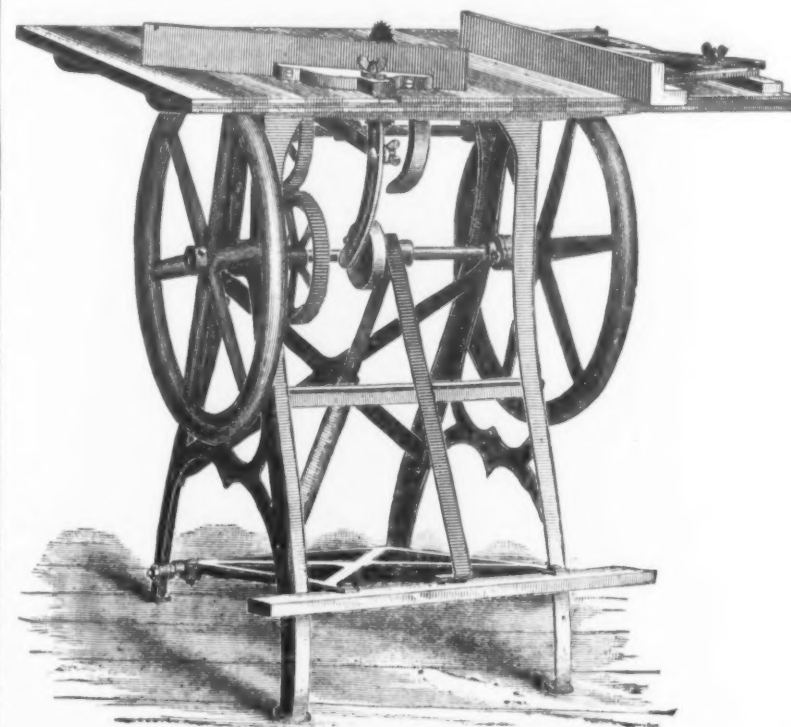
The value of a brick arch in the fire-box of a locomotive seems now to have been firmly established, recent experiments on the Old Colony Railroad having added conclusive results to already existing data. The experiments were conducted by Mr. J. N. Lander with two high-speed locomotives, built by the Taunton Locomotive Works, and of precisely the same dimensions and in about the same condition. One engine was furnished with the Pennsylvania Railroad style of brick arch, supported by water tubes, while the other engine had a plain fire-box. The engines were worked alternately on the same trains for about two months, and every precaution was taken to insure trustworthy results. The records for one month showed a coal consumption in the engine with the plain fire-box of 39.3 pounds per train mile, and in that with the brick arch of 34.3 pounds, indicating a saving of about 14 per cent. of coal by the use of the arch. Other records obtained under about the same conditions furnished similar results, and apparently leave little doubt as to the comparative merits of the two arrangements of fire-box.

A report comes from Philadelphia that an advance in the selling price of anthracite coal is secretly contemplated for September 1, with a September curtailment conditioned on the continued dullness in demand.

The new law prohibiting foreign labor contracts is practically inoperative, no provision being made for its enforcement.

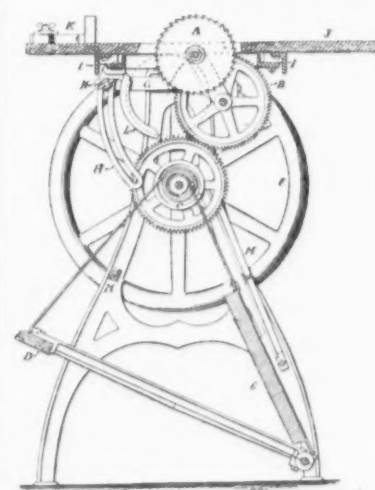
### Foot-Power Circular Saw.

The perfection obtained by steam-power wood-working machinery has developed a demand for efficient tools to be operated by manual power. Steam for some time to come must be confined to permanent workshops, where its advantages make it indispensable. On small buildings in process of construction, however, and in the shop of the job carpenter, manual labor still holds its own. In both interior and exterior finish of houses, stores, &c., there is a considerable amount of detail work which is best done where the work is to be put in place. For this class of work the Narragansett Machine Company, of Providence, R. I., are directing attention to their foot-power circular saw, shown in the cuts herewith. This tool, they claim, will do the work quicker and more accurately than can be done by hand, and with far less expenditure of force. The machine



General View of Foot-Power Circular Saw, Built by the Narragansett Machine Company, Providence, R. I.

referred to weighs about 200 pounds. It is provided with two balance-wheels which give the saw a steady motion and keep it running for a considerable period after the power of the foot has ceased. The table is 36 inches wide and 30 inches deep, made of cherry wood. It is provided with all necessary gauges. The treadle operates by means of a clutch connection, so that its motion is in no way controlled by the motion of the machine. The treadle may be operated irregularly without interfering with the working of the tool. When the foot is lifted from the treadle, the latter is raised by a spring, so as to be in



Sectional Elevation of Foot-Power Circular Saw.

position for the next stroke. The company guarantees these machines, which are simple in construction, to be thoroughly made of material best suited for the work they are intended to perform. A neat circular describing these tools is sent to all applicants.

### LATEST LEGAL DECISIONS.

#### BANKING.

A check of B. on the Second National Bank of Jersey City and the check of H. on the Clinton National Bank were deposited by the payees in the City Bank of Jersey City. These checks were indorsed, generally, "Not for collection." The next day the City Bank failed, owing the First National Bank of Jersey City \$58,300, and it delivered the checks of B. and H. to it in part payment of this indebtedness. B. and H. directed their bank to refuse payment, which was done, and the holder sued them for the amounts of the checks, and recovered judgment. These judgments—Hoffman vs. First National Bank of Jersey City, and Bennett vs. First National Bank of Jersey City—were carried to the Court of Errors and Appeals of New Jersey, where they were affirmed. Judge Parker, in the opinion, said: "If the indorsement had been 'for collection,' the City Bank would have had no ownership of the checks, and the plaintiff could not have recovered upon them. But they were indorsed generally and passed to the credit of the depositors in the City Bank, and from that moment became the property of that bank, which became liable to the depositors to pay any checks they might draw against

their accounts. The City Bank taking full title to these checks, it could pay them to the plaintiff as so much on account of its indebtedness, and it could recover from the makers and indorsers of the check."

#### INKEEPER—INFECTIOUS DISEASES IN HOUSE.

G. went to the hotel of H., and there contracted smallpox, that disease, being in the house, and concealed from G. and other guests coming there. She sued for \$5000, having been taken to the "Fest House," seriously ill, and becoming greatly disfigured by the marks of the malady. She recovered a judgment, and the innkeeper carried the case—Gilbert vs. Hoffman—to the Supreme Court of Iowa, where the judgment was affirmed. Judge Reid, in the opinion, said: "When the plaintiff went to the hotel one of the guests was lying ill in the house, and the disease turned out to be smallpox. It appears that the defendant was told the day

before plaintiff came to his house that the complaint was smallpox, as it was shown to be, and yet he took no precaution to protect those coming as his guests. Indeed, there is evidence showing that the defendant assured the plaintiff that the disease was not in his house. That the defendant is liable there can be no doubt. He is bound to protect guests coming to his house from any danger whatever. By keeping his hotel open for business, he, in effect, represented to all travelers that it was a reasonably safe place at which to stop, and he is hardly in a position now to insist that one who accepted and acted on his representation, and was injured because of its untruth, shall be precluded from recovering against him for the injury, on the ground that she might, by further inquiry, have learned of its falsity."

#### PROMISSORY NOTE—VALIDITY.

S. sued on a note made by G. & B., and he defended the action on the ground that, as the note was given to stop the prosecution of a criminal complaint made by S. against G. for obtaining money from him by false pretenses, it was not valid, the enforcement of such an obligation being against public policy. The plaintiff recovered, and the defendants carried the judgment to the Supreme Court of Pennsylvania, where the case—Geier vs. Shale—was again decided against them. The Chief Justice (Mercur), in the opinion, said: "It is well settled that an agreement in consideration of stifling or compounding a criminal prosecution or proceeding for a felony or misdemeanor of a public nature is void. There are, however, misdemeanors of an inferior class in which the public is presumed to have less interest; they affect, chiefly, the parties especially aggrieved, and the settlement of such offenses is not unlawful, and the agreement to the effect will be enforced. The obtaining of money by means of false and fraudulent representations, with intent to cheat and defraud, is an offense for which there would, also, be a remedy by action, and it may be settled by the parties."

#### LIFE INSURANCE—ASSIGNMENT.

B. insured his life, and three years afterward assigned the policy to D. the company approving the assignment. For six years the assignee paid the assessments, but on claiming the insurance money (\$2000) he was refused payment, on the ground that the administrator of B. demanded its payment to him, as the assignment to D. was not valid, he having no insurable interest in the life of B. The administrator, H., then sued D., to determine the question, and the court gave the administrator the money on the ground stated by him—that D. had no insurable interest—but required H. to pay D. \$715.53, the amount paid for the policy and the assessments made upon it, with interest. The case—Downey vs. Hoffer—was carried to the Supreme Court of Pennsylvania, where the judgment was affirmed. The court, in the opinion, said: "It must be conceded that on principles of law applicable to contracts generally this judgment would be wrong. The rule, however, applicable to this class of cases appears to rest on public policy, which forbids gambling on the duration of human life. It is not sufficient that the sale and purchase of this policy may have been in good faith and with correct motives. The mischief resulting from a sale of the policy for the purpose of speculating on human life is so contrary to the policy of the law, and so in conflict with the just principles of life insurance, that it is unsafe to relax the rule that the holder of the policy must have some pecuniary interest in the life of the person insured—some interest which the death of the insured would affect."



**L. COES'**  
GENUINE IMPROVED  
**Knife Handle**  
PATENT  
**Screw Wrenches**  
MANUFACTURED BY  
**L. COES & CO.,**  
Worcester, Mass.  
ESTABLISHED IN 1839.




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Sectional view illustrates our NEW KNIFE HANDLE, showing Malleable Iron Frame and Shank of Bar keyed into position.  
Straight Bar, Extra LONG NUT FOR SCREW IN JAW.

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RIM AND MORTISE DOOR LOCKS WITH  
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MANUFACTURERS OF  
  
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**WARREN'S**  
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Jack Screws, Tire Benders, Track Jacks,  
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SAD IRONS, COPYING PRESSES AND STANDS, &c.

The **PHILADELPHIA NO. XX ROLLER SKATE**



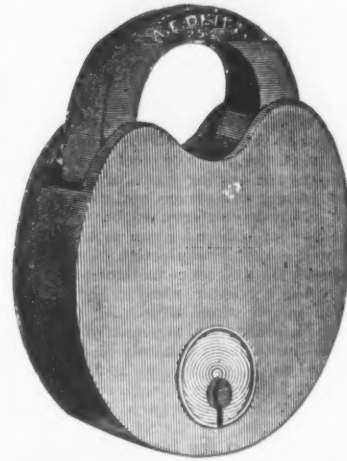
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Showing Style of Phila. No. XX Roller Skate. Sizes running from 7 1/2 to 12 inches.

With this Skate it is possible to describe the smallest circle; do the fastest skating with greater ease than can be done upon any other skate upon the market.

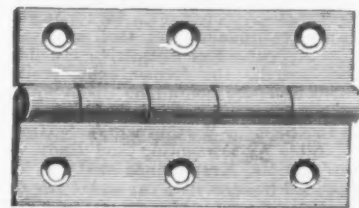
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UTMOST SATISFACTION.

Main Belting Co.,

Manufacturers of  
**THE LEVIATHAN**  
**COTTON**  
**BELTING.**

Unsurpassed for  
Strength, Durability and  
Cheapness.  
Made to any Length,  
Width and Strength.

Main Driving Belts.  
Guaranteed to Run  
Straight, Even Through  
out.

No Cross Joints, Un-  
affected by Damp.  
Clings well to the Pulley.  
Has no equal. In fact,  
is THE BELT.

**MAIN BELTING**  
**COMPANY,**  
S. W. cor. Ninth and Reed  
Sts., Philadelphia.  
Also  
248 East Randolph St.,  
CHICAGO.

**PERINE PATENT**  
**Double Shank, Curved Blade Hoe.**

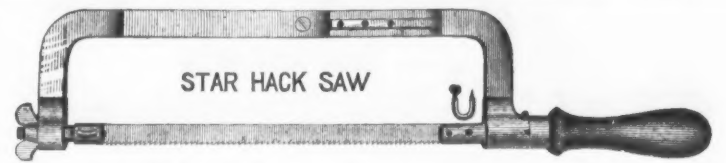


The characteristic feature of the invention  
is a Double Shank and Curved Blade, making  
a shear cut and acting as gouge. Super-  
seded all others wherever introduced. A  
few moments' trial will show its merits.

MANUFACTURED ONLY BY  
**THE CANTON HOE AND TOOL CO.,**  
Canton, Ohio.  
Send for circulars and prices.

**WHIPPLE MFG. CO.**

MANUFACTURERS  
**Door Locks, Knobs,**  
BRONZE GOODS AND BUILDERS' HARDWARE.  
Soft Small Gray Iron Castings a Specialty.  
CLEVELAND, OHIO, U. S. A.



These **STAR HACK SAWS** are the only thing in our list for which the demand is steadily and rapidly increasing in these dull times. Every dealer who orders them is sure to increase the number in his second order. They will be in universal demand, and every store in the land can sell them at a profit, besides giving great satisfaction to their customers.

There is no risk in handling them, as we will take back every one which is not wanted, whether bought of us or some other dealer. We guarantee them to do double as much cutting as any other kind in market.

Length of Blade, 6, 7, 8, 9, 10, 11, 12, assorted, 6 to 9.  
Price per dozen, 55, 60, 65, 70, 85, 95, 105, 65 cents.

**STAR HACK ★ SAW FRAMES.**

WITHOUT BLADES.

Per doz.  
No. 0 extension frame, to hold 10, 11 and 12 inch, steel polished and nicked.....\$12.00  
No. 1 extension frame, to hold 6, 7, 8 and 9 inch, steel polished and nicked..... 9.60  
No. 2 solid frame, to hold 8 inch, steel polished and nicked..... 8.40  
As seen in the cut, these frames are all made adjustable, so as to face the blades in four different directions. They also have the patent staple-shaped pins to hold the blades in the frames, which are so arranged that they cannot fall out.

**MILLERS FALLS CO.,**

No. 74 CHAMBERS ST., NEW YORK.

**CHAMPLAIN**  
**Forged Horse Nails.**  
MANUFACTURED BY THE  
**NATIONAL HORSE NAIL CO.,**  
Vergennes, Vermont.  
HOT FORGED AND COLD HAMMERED POINTED. MADE OF BEST  
NORWAY IRON AND WARRANTED.  
WAREHOUSE,  
97 CHAMBERS AND 81 READE STREETS NEW YORK.  
**DURRIE & McCARTY, Sole Agents.**

H. B. SEIDEL, President. W. HASTINGS, Vice-Pres. and Gen'l Mgr. E. T. CANBY, Sec. and Treas.  
**THE SEIDEL & HASTINGS CO.,**  
WILMINGTON, DELAWARE,  
New York Office, No. 221 Pearl, Corner Platt Street,  
MANUFACTURERS OF  
**BEST CHARCOAL**  
**BOILER PLATES,**  
AND PLATE IRON GENERALLY.  
ALSO BEST QUALITY HOMOGENEOUS STEEL PLATES.

We ask the special attention of the trade to our C. H. No. 1 Boiler Plates, which we manufacture expressly for the Shells of Steam Boilers and stamp 50,000 pounds T. S. when desired. One hundred and sixteen tests of this iron, made during the last three years by the U. S. Inspectors of Steam Vessels, show an average tensile strength of 58,505 pounds to the sectional square inch, and an average reduction of area of the fractured section of 30 1/2 per centum. Our prices are as low as the production of a good article will admit of.

**VARIETY IRON WORKS.**  
  
**ALFRED C. REX & CO.,**  
Manufacturers of  
**PATENTED HARDWARE SPECIALTIES AND NOVELTIES.**  
MAIN OFFICE AND FACTORY: FRANKFORD, PHILA. BRANCH OFFICES: 126 Chambers St., New York, Chas. E. Spier, Mgr. and 415 Commerce St., Phila.  
New Spring Specialties—King Egg Beaters, awarded medal at American Institute, New York; King Candle Lamo and Lantern, cheapest combination ever made.

**STRONGEST ACME WRENCH AND BEST.**



ALL STEEL CASE-HARDENED JAWS, WARRANTED. MANUFACTURED BY  
**OWSLEY BROS. & MARBLE,** 784 to 794 Madison St., CHICAGO, U. S. A.  
NEW YORK WAREHOUSE, CHAS. X. CORDIER, AGT.,  
101 Chambers St. and 156 Church St.

**PURE TURKISH EMERY.**

**WALPOLE EMERY MILLS**  
South Walpole, Mass.



## THE WEEK.

With all the cutting of wages complained of during the past six months a very large proportion of the laboring class of this city have managed to put something away for a rainy day. Accordingly, the reports of the 25 savings banks in New York for the first six months of 1885 show that the deposits exceed \$250,000,000, and the net surplus is over \$48,000,000. There are 629,918 depositors, and the average sum to each one's credit is a trifle less than \$400. In the last six months these depositors have saved nearly \$6,000,000.

A steamship conference about to be held in Liverpool will propose an increase of £1 in the steership rate to America.

The total number of vessels chartered by the British Government pending the recent Afghan frontier dispute was 135, with a registered tonnage of 300,000 tons, and a carrying capacity of more than 400,000 tons. For these the British Government agreed to pay, for a term of six months, 12/6 a ton where the vessel was furnished without a crew or officers, and 20/ a ton where officers and crew were furnished.

To encourage Russian shipbuilding the Government at St. Petersburg are said to have under consideration a scheme for imposing customs duties on vessels built abroad to the order of Russian subjects. Iron vessels of 500 tons and under will pay on entering a Russian port 10 roubles per ton; above 500, 5 roubles, and vessels built of iron and wood, 4 roubles per ton. This note of warning does not appear intended to affect vessels only trading with Russia, but newly-built ships coming for the first time under the Russian flag. Reckoning the rouble in round numbers at 2/ English, the charge for a 500-ton vessel would be about £1 per ton—rather a heavy tax to pay, and evidently leveled at British shipbuilders.

The British steamer *Oliveto*, which went ashore at Moriches, L. I., in the latter part of March last, and was subsequently purchased by Mr. William H. Starbuck, has been completely overhauled at a large expense, and will now sail under the American flag. Her name will be changed to *Starbuck*.

The Government of Guatemala protests against the refusal of the Pacific Mail Steamship Company to carry the Guatemalan mails on their steamer *Colima*, which left San Francisco August 1. The consul states that his Government entered into a contract which has not been complied with.

"It is perhaps not generally known," says *Kuhlow's German Trade Review*, "that there are some 220,000 Germans settled in Brazil, a country which absorbs the largest part of South American emigrants from Germany." It is not, therefore, to be wondered at that a large portion of the foreign trade of Brazil lies in German hands. Despite this fact English capital is dominant in Brazil, as shown by the amount of bills drawn on London, which in the year 1880 was not less than £17,642,000, far in excess of the amount on either Germany or France.

Ranchmen in the northern tier of Mexican States have commenced importing a superior breed of cattle from New Mexico and Texas, the climate being admirably suited to stock raising.

General Caceres, who leads the hostile forces opposed to the Government of Peru, spurns all advances looking to reconciliation.

The International Telegraph Congress, which met in Berlin on Monday, 10th inst., is attended by delegates from all the European States, and from Brazil, British India, Dutch India, Egypt, Algeria, Cochinchina, Japan, Natal, New Zealand, Persia, Siam, Cape Colony, South Australia and Victoria, as well as from all the great cable companies. The chief subjects of deliberation will consist of various technical questions, including more especially a general reduction of tariffs.

A company of Montgomery (Ala.) capitalists have bought the town of Calera, and will proceed to build a manufacturing city. Calera is at the intersection of the Louisville and Nashville and the Tennessee, Virginia and Georgia roads, 60 miles north of Montgomery.

Major George W. McLean, the commander of the Old Guard, was appointed receiver of taxes, to succeed Gen. Martin T. McMahon, recently made United States marshal for this district. Major McLean is over 60 years of age, and during 1868 and 1869 held the office of street commissioner, succeeding Charles G. Cornell. The new receiver was strongly recommended to the controller by prominent capitalists and business men. The salary of the receiver of taxes is \$4000 a year, and the office has no fixed term. The new receiver has been for many years a member of the New York Stock Exchange, and was at one time president of the Open Board of Brokers.

Rev. G. Grenfell, just returned to England, reports an important addition to our knowledge of the hydrography of the Congo basin. He has proved that the Mobangi, which enters the right bank of the Congo, forming a great delta, between 26° and 42° south latitude, nearly opposite Equator Station, is probably its greatest tributary. From the notes sent home it would seem that the Mobangi is navigable the whole way from the Congo to 4° 30' north, a distance

of probably 400 to 450 miles, taking account of the bends. The Mobangi, Mr. Grenfell writes, is far more populous than any equal length of the Congo, and to his mind the country is more promising. The commercial importance of Mr. Grenfell's discovery is due to the circumstance that the Mobangi must form an important connecting link between the basin of the Congo and the basins of the Niger, the Shari and the Nile. Mr. Stanley has always maintained that the region lying between the Congo and the Nile is probably the richest and most promising in Africa, and his belief seems likely to be amply confirmed.

A spectator who viewed the approach of the recent terrific cyclone on the Delaware River says: "The tornado was first seen high in the air in the neighborhood of Red Bank. At that time it looked like an oblong cloud of almost inky blackness, lying horizontally. Though irregular in shape, it what resembled a cone. It moved with its apex toward the earth. The apex curled about like an elephant's trunk, and was inclined forward, as though leading on the black mass. As the tornado moved from Red Bank and up the 'Neck,' the lowest part appeared to be 200 or 300 feet above the earth. The whirling mass gradually approached the ground until it struck the salt works, whence it passed across the Delaware to Kaighn's Point, went through Camden, recrossed the river and passed up Port Richmond, where it disappeared."

The charge for telegraphing in England has been a shilling, equal to 24 cents of our money, for ten words, exclusive of address, for all distances. This moderate rate last year produced receipts of \$8,800,000, while the working expenses were \$8,500,000, leaving a net revenue of about \$300,000. The charge is now to be reduced to sixpence, or 12 cents, for ten words, exclusive of address, and it is believed that the increased business will in two years give a larger revenue than that of last year.

The expenditure of Europe in armaments amounted last year to £183,519,997. Russia is easily first with a total of more than £46,000,000, France is second with more than £33,500,000, Great Britain third with nearly £31,500,000, and Germany fourth with over £22,500,000. France is first with a national debt of over £960,000,000, Great Britain second with over £758,000,000, Russia third with £603,500,000, and Spain fourth with £501,000,000. This is a surprising prominence for Spain, which has an annual expenditure of only £35,000,000, and a military expenditure of only £6,250,000. As for Germany, her debt is a comparative trifle.

Hugh Larkin, the Commissioner of Statistics of Ohio, has been investigating the cost of maintaining the families of mechanics in that State, and finds that it is less than the cost of maintaining prisoners in the county jails, being 32.45 cents per capita a day for the former, and about 55 cents a day for the latter.

A report comes from the West that settlers are flocking into Dakota from Manitoba. They complain that they have to haul their crops a great distance to market and then sell for very low prices; also that the Canadian Pacific possesses all the best land and imposes hardships upon settlers.

Complaint comes from Philadelphia that the cable roads are not yet running, although the builders have been tearing up the streets for a full year.

The Southern Exposition opens in Louisville August 15. The floor is already covered with the foreign exhibits that come from New Orleans, and new displays from foreign countries are arriving every day. The 13 acres in the main building will be crowded.

The first of four immense guns ordered by the Italian Government, and intended for coast defense, has just been constructed at Friedrich Krupp's factory in Essen. The monster, itself weighing 120 tons, was tested at Meppen, whither it was transported on two specially constructed trucks, each weighing 39 tons, connected by a smaller one weighing 19 tons. Two hundred and ninety-five kg. of powder are required to propel a shell of 1050 kg., the guaranteed distance of upward of 9 miles.

The elevated railroads did a crushing business on the day of General Grant's funeral, the number of passengers carried reaching 378,000, or 62,000 more than on the bridge opening. There was no blocking of trains, and the crowds were transported without accident. More than 100,000 persons crossed the bridge.

Governor Gleason, of Florida, predicts that the pineapple crop of that State will be more important than the orange crop. The common scrub and palmetto lands are well suited to its culture.

The Northern Pacific Railroad Company expect to make the transportation of tea from China and Japan one of the chief features of their freighting business. According to the statement of one of our leading merchants, out of a total of 37,000,000 pounds of tea from Japan the past season, about 20,000,000 came by the Suez Canal, about 11,000,000 by railroad from San Francisco to this city, and about 6,000,000 pounds went by rail direct to Chicago, St. Paul and other intermediate points. Thus of about

75,000,000 pounds of total import not more than 25,000,000 came through this country, or, in other words, the great freight profit on two-thirds of our importation of tea went into the hands of British capitalists.

The foreign commerce of Venezuela is not disturbed by revolutionary movements there, and merchant vessels are not liable to blockade or seizure at any of the ports. According to statements obtained from the consulate in New York, which, possibly, are not too highly colored, the country is rich in mineral and vegetable wealth, and is being developed with wonderful rapidity. Capitalists in New York are now forming companies to build railroad and steamship lines to build up the commerce of Venezuela and to bring the rich productions of the interior to the seacoast. Before many years the commerce between the United States and Venezuela will be enormously rich. The steamship line between New York and Venezuela ports has steadily prospered.

Business was suspended throughout the United States on Saturday, the day of General Grant's burial, as a mark of respect. The demonstration in this city was imposing beyond precedent. At least 60,000 men were in the procession, and the number of spectators on the line of march, although estimates are widely at variance, could not have been less than half a million.

A Canadian order in Council makes the tolls 2 cents per ton through both the St. Lawrence and Welland canals, or either canal alone.

The United States commissioner of internal revenue reports that the total collections for the fiscal year amount to \$112,020,111. The cost of collecting was about \$4,480,000, being 39 per cent. of the amount collected, and \$600,000 less than the cost for the year 1884. The reduction is in the following items:

Salaries and expenses of collectors.....	\$63,000
Salaries and expenses of agents and subordinate offices.....	420,000
Stamps and paper.....	85,000
Detecting fraud.....	20,000
Office pay-roll.....	10,000
Total.....	\$600,000

The collector reports, further, that no combinations to defraud the Government of its revenue are known to exist, and it does not appear that the illicit manufacture of either whiskey, tobacco or cigars is carried on in any part of the country to such an extent as to occasion material loss to the Government.

Speaking of New Zealand sawmills, an Auckland correspondent says the saws used are mostly of American make and are considered much superior to any others. There are some very large sash, door and blind factories, and almost without exception the machinery is from the United States. The mills will cut a daily average of 10,000 feet each.

Major Allen, United States army engineer in charge of the river improvements at St. Paul, Minn., reports that three of the reservoirs for improving the navigation on the Upper Mississippi have been completed. The capacities of these are 40,000,000, 30,000,000, 22,000,000, 20,000,000 cubic feet, and 3,000,000,000 cubic feet, respectively. To fill them requires 26 months, 24 months and from one to two months, respectively. The object of these reservoirs is to accumulate water to be let out when the rivers are at low stage, and so increase the depth of water in the channel. He reports that the experiment has worked to the entire satisfaction of the engineers, and recommends an appropriation of \$50,000 for further surveys for the reservoir system.

The Association for Commercial Geography and the German Export Bank are preparing to establish in Transatlantic commercial centers permanent exhibitions of German industrial products. Advices from Russia say that the Government is taking severe measures to repress German enterprise, having stopped the construction of Schöen's great spinning mills at Kattowitz, and refused permission to Count Henckle, the owner of iron works near the Prussian frontier, to erect houses.

The steamship *Etruria*, of the Cunard Line, made the east-bound trip from New York to Fastnet Light in 6 days, 5 hours, 35 minutes, beating the record.

The Barge Office was established under an act of Congress to afford facilities for the examination of baggage arriving by foreign steamers, and J. H. Starin, who contracted to provide means of transportation between ship and shore, fitted up a fleet of steamers at considerable expense. The office is now virtually abolished, but Mr. Starin holds a contract which has three years to run, and the question is asked what he is going to do about it.

The City of Palatka, built by John Roach & Son, at Chester, Pa., about two years ago, is the only twin-screw coasting steamer on the Atlantic seaboard. She is provided with two independent compound fore-and-aft engines, which drive her 15 knots an hour.

Thomas D. Hodgkinson, late of the Cassidy & Co. Steel Works, of Pittsburgh, has been appointed general manager of the Crown and Cumberland Steel Works, of Cumberland, of which Mr. E. T. Cassidy is president, in place of Charles Capper, resigned.

Iron was used in the construction of vessels at a much earlier date than is generally supposed, as the following entry in the *Gentleman's Magazine* for May, 1777, will

show: "On Tuesday, the 20th, a new pleasure boat, constructed of sheet iron, was launched into the River Foss, Yorkshire. She is 12 feet in length, 6 in breadth, has sailed with 15 persons on board, and may be conveyed to and from the river by two men."

The New York Custom House collector recommends that duplicate warehouse certificates should cease. Merchants have been in the habit of getting two, three, four or five warehouse tickets, sometimes two or three months after the goods have been deposited. They might have passed out of the custody of the Government before the duplicate certificates were given, and were open to suggestions of fraud.

The Canadian immigration returns for July show a falling off as compared with those for the corresponding month of 1884, but the decrease is much less in proportion than for the previous months this year.

Grain exports at San Francisco are very slow, and the inquiry for coal and lumber freights is by no means urgent.

The Willimantic (Conn.) Water Works are nearly ready for the pumping machinery.

The first bale of Louisiana cotton, new crop, was received in New Orleans on the 8th inst., and the first from Alabama was received in Selma on the same day.

The South has 233 cotton mills in operation, running over 1,000,000 spindles, not to speak of her growing iron interests, from which it is argued that the States hitherto chiefly devoted to cotton culture are only now learning wherein lies their real strength, and that reliance upon a single staple crop is a mistake.

The Confederate colony in San Paulo, Brazil, numbering 600 souls, are nearly all engaged in farming and manufacturing. At the capital of the province are extensive iron works.

The Illinois Central Railroad Company and other corporations are building piers, driving piles, dredging and dumping sand into the lake at and near Chicago for the purpose of building islands to be used as pleasure resorts, which work is said to threaten the navigation of the harbor.

Bureau reports are not to be made public hereafter until they have been submitted to Congress through the President.

Cyrus W. Field entertained 250 gentlemen at the Star and Garter, in London, on the 5th inst., to celebrate the 27th anniversary of the completion of the Atlantic cable.

The report of the assessors of Boston for the present year places the valuation of real and personal property at \$685,404,600, a gain of \$2,748,000 over the valuation of 1884. The tax rate will be \$12.80 per 1000, as against \$17 in 1884. The decrease is largely due to an act of the last Legislature limiting the rate in Boston.

Jules Garnier has designed an elevated railway for the French capital, to be completed in time for the exposition in 1889. The road will be about 18 miles in length and will cost \$10,000,000.

It is reported that rail freights from St. Louis to the seaboard are still on the basis of a 15-cent rate from Chicago, the same as before the tariff was raised to 20 cents three weeks ago.

The estimate of the last Cuban sugar crop, made by a leading firm in Matanzas, makes the aggregate 500,000 tons, of which 560,000 were for export, an increase of 7 per cent., compared with the previous crop.

The British Chancellor of the Exchequer, referring to the mission of Sir Henry Drummond Wolff as special envoy to the Sultan, says: "The Government's policy is to put Egypt on a solid footing with regard to external defense, finance and internal administration. Our policy is to gradually give security and freedom to Egypt's independent action in the future."

Renewed activity is noticed in the German shipyards, as on the Clyde. The Vulcan Works, of Stettin, have just received a contract for six new German Lloyd steamers, and three new fast-going steamers for the American Line have been ordered from the Elder Company, Govan.

Of the 18,950 tons of steel rails required by the Italian railways, 8600 tons are to be delivered by the Bochum Association, the Phoenix and the Hoerde. Another well-known German firm, that of Krupp, have recently received an order for 10,400 tons of steel rails from Brazil.

The American consul at Winnipeg, J. W. Taylor, has given in his report on the trade of the Canadian Northwest for 1884, showing that the imports amounted to \$12,784,719, of which \$7,098,538 was from Eastern Canada, \$4,439,810 from the United States and \$1,174,707 from Great Britain. Mr. Taylor has not so favorable figures of the export trade of the Winnipeg region, but is of the opinion that stock raising is destined to have a commercial value in the Northwest as important as in Montana.

Secretary Whitney notifies Mr. Roach's assignees that the contracts for the new cruisers Boston, Atlanta and Chicago have been forfeited, and that the Government will complete the work at the navy yards, after making an inventory and appraisal of the work done thus far. When all is fin-

ished, there will be a settlement with the contractor in accordance with the usual business methods.

The contract for building the masonry piers of the Baltimore and Ohio bridge across the Schuylkill River has been let to Drake & Stratton, of New York. In some cases it will be necessary to sink the wooden caissons 60 feet through the deposit of silt before bed-rock is reached.

J. H. Boone, proprietor of the Stony Creek Rolling Mills, at Norristown, Pa., have made an assignment. The collapse is attributed to the general depression in trade.

An exchange remarks that there is little profit in the Northern Pacific Railroad hauling wheat its entire length for \$8 a ton, but, until its local traffic assumes larger proportions, it is better to do business on these terms than to haul empty cars East or to let them remain idle in the yards.

The imports of Mexican dollars by rail at San Francisco during the first six months of the year about equaled 5,200,000—the largest importation of that description in a long while. Most of them have been shipped to China.

Sir John Kirk, the British Consul-General at Zanzibar, telegraphs that the Sultan has appealed to the English fleet for protection against alleged German aggression.

Secretary Whitney visited the navy yard in Brooklyn on Monday and ordered more machinery for the construction department.

A train on the Grand Trunk Road plunged through a bridge into the Welland Canal on Monday, because an air-brake failed to work. The engineer was killed.

President Norvin Green, of the Union Telegraph Company, does not contemplate placing any more wires above ground. Eventually all the trunk lines will be carried out of the city with insulated wires underground.

The preliminary trials of speed thus far encourage a belief that either the Puritan or *Priscilla* will outtail the English yacht *Gesta*. If they do not, it will be the proper thing for American yachtsmen to acknowledge the superiority of the English yacht model and build accordingly.

A proclamation by President Cleveland directs that any and every unlawful inclosure of the public lands, maintained by any person, association or corporation, be immediately removed.

The Harlem Railroad bridge across the Croton River in Putnam County, having a span of 160 feet, has been replaced with a bridge of iron. The main structure was finished in 10 days from the time when work was commenced and with but 15 minutes delay in the crossing of railway trains.

The *World* announces the completion of the fund of \$100,000 raised through its appeals in behalf of the Bartholdi Statue. Over 120,000 contributors make up this munificent total. As a popular subscription, excepting cases of public disaster, pestilence or famine, the instance here noted has few parallels.

By the burning of Balfour's paper mill in Philadelphia 450,000 pounds of internal revenue paper, to have been delivered to the Government by October 1, were destroyed.

Carroll D. Wright estimates the population of Massachusetts at 1,940,000, a gain of about 160,000 on the United States census of 1880.

At Haverstraw, on the Hudson, 50 firms engaged in the manufacture of brick employ 3000 men and turn out 302,500,000 brick annually.

E. S. Stokes, president of the United Lines Company, announces that he has purchased the property of the Bankers' and Merchants' Telegraph Company, and is prepared to satisfy all prior liens upon the property until the new company has fully organized and prepared to issue its bonds, which will consist of \$1,200,000 of first mortgage bonds and \$3,600,000 of second mortgage.

Eight caissons sunk beneath the piers of the great bridge at Henderson have in their construction 225 tons of bolts and 1,640,000 feet of white oak.

The present population of the city of Buenos Ayres is estimated at 400,000. One of the local newspapers predicts that in a few years it will be the New York of the Southern Hemisphere.

Moro Phillips, of Philadelphia, a large owner of copper mines in Michigan, and a manufacturer of chemicals, died on the 9th inst. His estate is valued at \$10,000,000.

A Government commission has been appointed to inquire into the causes of the present depression in British trade. A dispatch says: "The only members versed in the subjects of the inquiry are Professor Price and Mr. Hicks. Mr. Gibbs, of the Bank of England, Mr. Goschen, Mr. Childers, Sir Thomas Brassey, a number of representative bankers of London, and every eminent economist in England, were asked to sit on the commission, but refused." Earl Granville opposed the appointment of the commission, reiterating his argument that the Government would encourage the public in the false belief that Parliament could by legislation remedy the evil complained of.







[illegible]



# WHOLESALE METAL PRICES, August 12, 1885.

## METALS.

**IRON.**—Duty: Bars, 8-10¢ to 1-10¢ per lb.; provided that no bar shall pay a less rate of duty than 35¢. Sheet, 11-10¢ to 15-10¢ per lb. Band, Hoop and Scroll, 1¢ to 1-4-10¢ per lb. Railroad Bars weighing more than 25 lb. per yard, 7-10¢ of 1¢ per lb.

### Standard American Pig Iron.

Foundry No. 1 X.....@ 18.00  
Foundry No. 2 X.....@ 16.00  
Gray Forge.....@ 15.00

### No. 1 Scotch Pig Iron.

Carnbroe.....@ 18.50  
Coltress.....@ 19.00  
Shotts.....@ 19.50  
Glenarmock.....@ 19.00  
Gartbarrie.....@ 19.50  
Langloan.....@ 20.00  
Summerlee.....@ 19.00  
Dalmeny.....@ 18.50  
Kilgint.....@ 17.50  
Clyde.....@ 18.50

### Rails.

Steel, at Eastern mills.....@ 27.00  
O'd Rails, Ts.....@ 16.00

### Scrap.

Wrought, per ton, from yard.....@ 18.00

### Bar Iron from Store.

Common Iron:  
3/4 to 1 in. round and square.....@ 1.60  
1 to 1 1/2 in. round and square.....@ 1.75

Refined Iron:  
3/4 to 1 in. round and square.....@ 1.85  
1 to 1 1/2 in. round and square.....@ 1.90

1 to 1 1/2 in. round and square.....@ 1.95  
1 1/2 to 2 in. round and square.....@ 2.00

2 to 2 1/2 in. round and square.....@ 2.05  
2 1/2 to 3 in. round and square.....@ 2.10

3 to 3 1/2 in. round and square.....@ 2.15  
3 1/2 to 4 in. round and square.....@ 2.20

4 to 4 1/2 in. round and square.....@ 2.25  
4 1/2 to 5 in. round and square.....@ 2.30

5 to 5 1/2 in. round and square.....@ 2.35  
5 1/2 to 6 in. round and square.....@ 2.40

6 to 6 1/2 in. round and square.....@ 2.45  
6 1/2 to 7 in. round and square.....@ 2.50

7 to 7 1/2 in. round and square.....@ 2.55  
7 1/2 to 8 in. round and square.....@ 2.60

8 to 8 1/2 in. round and square.....@ 2.65  
8 1/2 to 9 in. round and square.....@ 2.70

9 to 9 1/2 in. round and square.....@ 2.75  
9 1/2 to 10 in. round and square.....@ 2.80

10 to 10 1/2 in. round and square.....@ 2.85  
10 1/2 to 11 in. round and square.....@ 2.90

11 to 11 1/2 in. round and square.....@ 2.95  
11 1/2 to 12 in. round and square.....@ 3.00

12 to 12 1/2 in. round and square.....@ 3.05  
12 1/2 to 13 in. round and square.....@ 3.10

13 to 13 1/2 in. round and square.....@ 3.15  
13 1/2 to 14 in. round and square.....@ 3.20

14 to 14 1/2 in. round and square.....@ 3.25  
14 1/2 to 15 in. round and square.....@ 3.30

15 to 15 1/2 in. round and square.....@ 3.35  
15 1/2 to 16 in. round and square.....@ 3.40

16 to 16 1/2 in. round and square.....@ 3.45  
16 1/2 to 17 in. round and square.....@ 3.50

17 to 17 1/2 in. round and square.....@ 3.55  
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## INDUSTRIAL ITEMS.

## MAINE.

The Katahdin Charcoal Iron Company, to whose organization at Bangor we referred some weeks ago, have a capital of \$60,000—600 shares of \$100 each. The directors are Chas. V. Lord, F. H. Wilson, Chas. A. Gibson, E. M. Hersey, of Bangor and A. P. Gould, of Thomaston. Treasurer and secretary, Henry McLaughlin. O. W. Davis, Jr., is the general manager, with office in Bangor, and Ernst Sjöstedt, recently from the Cherokee Iron Works, of Georgia, is the superintendent, with office at the furnace. The work of rebuilding is now being actively prosecuted, and the company expect to be in blast about October 15. The capacity of the plant will be enlarged to 600 tons per month of car-wheel charcoal pig iron. A large proportion of the product is already engaged.

## NEW HAMPSHIRE.

A new joint stock manufacturing company, with a paid-up capital stock of \$80,000, have been organized at Rochester for the manufacture of steel and iron cutting machines, a new invention.

The Cole Mfg. Co., of Lake Village, are at the present time doing quite a large business in their line of shafting, water-wheels, gearing, knitting machinery, &c., giving employment to about 100 hands.

## MASSACHUSETTS.

Business is very brisk at the Chapman Valve Works, at Indian Orchard. The contract for putting up the brick building on the site of the old brass foundry, recently demolished, which is to be used in part for carpenter work and for pattern-making, has been awarded to the Flynt Building and Construction Company, of Palmer, and the work will begin at once.

The Blake duplex pumps have arrived at Weymouth, and the building to cover them is nearly finished. The stand-pipe now towers about 65 feet in height, and only 10 feet more will be required to finish it. The chimney on the pumping station stands over 50 feet high, and will shortly be completed. The pumps have a capacity of 1,250,000 gallons per day.

The Diamond Watch Company's shop at Athol, after a six weeks' shut-down, has started on full time.

The New Bedford Electric Lighting Company are building a new chimney, 80 feet high, preparatory to putting in a new boiler and to increasing their capacity.

## CONNECTICUT.

The Ingraham Mfg. Co., of Bristol, are making extensive additions to their clock-manufacturing works. A new clock case, which is popular, has much to do with the advanced trade. Very soon this firm will have 400 men on their pay-roll.

The stockholders of the Vulcan Iron Works have sold out to William Foulds, of Manchester, and Gordon Brothers, of Hazardville, who have assumed the indebtedness of the company and resumed work after four weeks of idleness.

The Aetna Nut Company, of Southington, have closed their rolling mill for two weeks.

For nearly a year Colt's Armory, Hartford, has been running on short time; but because of the great increase in orders for the various articles manufactured by the company, full time, ten hours, for all hands has just begun. In all there are fully 550 men employed in the different departments. Some of the contractors are hiring new men. Nearly all the work is contract work. There are now in process of manufacture 44 Gatling guns. Twenty have been ordered by the United States Government, 23 are to fill foreign orders, and one is for a sample.

The Howe Machine Company, of Bridgeport, have sold a portion of their land east of the factory to a concern which employ 300 men, and will put up a large factory for the machine business.

The J. B. Savage carriage hardware concern, at Southington, has resumed operations. The factory has been closed during July for inventory.

## PENNSYLVANIA.

The plumbing mines in Upper Uwchlan, Chester County, owned by the Penn Graphite Company, are now about starting into operation. Fifteen men are at work making new shafts about 40 feet deep.

The Bridgewater Gas Company, owning gas territory in Beaver County, are now prepared to furnish that fuel cheaply to the boroughs of Seneca Falls, New Brighton, Beaver, Bridgewater, Rochester and Fallston at very low rates. With this cheap fuel the towns named, which are all located in close proximity in the neighborhood of the confluence of the Ohio and Beaver rivers, in Beaver County, will no doubt soon become one large manufacturing city.

It is reported that a number of Youngstown (Ohio) capitalists are endeavoring to lease the "new" mill at New Castle, owned by the heirs of W. H. Brown.

The plant which the E. & G. Brooke Iron Company are building alongside of their cast-house, at Birdsboro, is a plain, simple tilting converter with horizontal tuyeres 7 inches above the bottom.

The new Washington Steel Works, at Reading, have just been completed. Walter M. Stein, Thomas E. White and R. C. Borchers, of Philadelphia, are the proprietors. The chief product will be steel castings. The melting furnace has a daily capacity of 10,000 pounds. Raw material is tested at the works, and the furnaces are run with gas. Among the orders now on hand are two large tanks for chemical purposes for the Pennsylvania Salt Works, of Philadelphia; a lot of switches and crossings for the Market Street Railway, Philadelphia; pins for the Pencoed Iron Works, and coupling boxes for pinions for McIlvain & Son's boiler-plate mill.

The Solar Carbon and Mfg. Co., of Philadelphia, have been chartered, with a capital stock of \$300,000. The company are organized to manufacture, purchase, use and sell carbon in its various forms, including

electric carbon, and will use as their chief material carbon obtained from natural gas. The directors are James McC. Creighton, B. K. Jamison, James B. Young, Joseph F. Tobias, M. E. McDowell and Harry L. Frank, of Philadelphia, and John W. Patterson, of Pittsburgh.

The Kemble ore mines, at Riddlesburg, which supply the Kemble Furnaces, at that place, have shut down, owing to dullness of trade.

We are informed by Mr. James Henderson that some Boston capitalists have taken out licenses for his various steel processes, and are moving the furnace at Bellefonte to Boston, Mass., where the processes will be used in it. They were induced to take this step upon the representations of the Messrs. Gogin, who were for 10 years in charge of the steel-melting department of Naylor & Co., at Boston, and who stand very high in the ranks of American metallurgists.—*Iron and Steel Association Bulletin.*

## PITTSBURGH AND VICINITY.

It is stated that coal is being mined near Pittsburgh at 1½ cents a bushel, the lowest price for years, and yet the miners refused to accept the Weeks award which would have held digging at 2½ cents.

A convention of the Monongahela, Kanawha and Ohio River miners is suggested to take united action toward raising the price of mining. The miners on the Monongahela River are digging for 2 and 2½ cents, and even less, while the miners of the Kanawha are on a strike for higher wages.

On Thursday of last week Carnegie Bros. & Co. completed an artesian well at their Union Rolling Mill. It is intended to supply pure water for their employees.

The two blast furnaces which Messrs. J. P. Witherow & Co., of Pittsburgh, are erecting at Dayton, Tenn., for the Dayton Iron and Coal Company, an English organization, are almost completed. The fire-brick lining of these furnaces was made by S. Barnes & Co., Limited, at Rochester, Beaver County.

Isabella Furnace No. 2 was banked a few days ago. No. 1 is cold.

Wilson, Walker & Co., Limited, have added a new department to their mills for the manufacture of mining appliances and machinery, including pit cars. Sheriff & Ashworth have the contract for equipping these shops with machinery.

## OHIO.

The Ohio Furnace, at Zanesville, is to blow out for a long rest about the 12th of August.

The Hecla Furnace, in the Hanging Rock region, is to blow in next week.

The Falcon Iron and Nail Company, of Niles, have decided to rebuild their burned mill. The buildings will be more compact, but the capacity of the works will be the same as before. The old "Falcon" iron nail will be manufactured.

Five hundred miners, representing 13 mines in the Massillon district of Ohio, met on August 4, and by a two-thirds vote agreed to resist the reduction from 75 to 60 cents per ton in the price of mining. This decision will force 1200 men in the district out. There are now 6700 miners in Ohio working for 40 cents per ton and 2000 for 50 cents. Miners in Tuscarawas Valley have been receiving 35 cents more per ton than those in Hocking Valley.

It is stated that citizens of Middleport are endeavoring to induce the Standard Nail and Iron Company to remove their mill from Clifton, W. Va., to that place.

Winona Furnace, in the Hocking Valley, will be blown in about September 1.

## ILLINOIS.

The Ashley Wire Company, of Joliet, have purchased the machinery of the National Wire Company, of Chicago, and are removing the same to their plant at Joliet.

The Plano Steel Works, a new enterprise at Plano, will be erected and in running order within the next 90 days. The company have purchased the tools and machinery of the Chicago Steel Wheel Company, and they purpose in addition to erect a rolling mill for rolling the material used in their manufactures. They intend making the McDowell patent steel wheel for agricultural implements and vehicles, and will also be enabled to manufacture other forms and shapes for agricultural implements. The plant will combine several new and interesting features, and will be very complete in all respects. Major McDowell, of Chicago, is to be the general manager.

A large steam hammer and a combined punch and shears are being placed in the works of the Chicago Forge and Bolt Company, at South Chicago.

An improved stuffing machine has just been consigned to New Zealand by the Hercules Iron Works, of Chicago, who report a larger amount of general machine work on hand than at any time in the past 18 months.

## MISSOURI.

The Wrought Iron Range Company, St. Louis, are making a weekly output of 500 ranges, and still are unable to keep up with their orders.

The Shickle, Harrison & Howard Iron Works, St. Louis, are making about 100 tons of castings every 24 hours.

Hoyt's Metal Works, located on the Clayton road, near St. Louis, were recently destroyed by fire. The loss is \$2000; covered by insurance.

## MARYLAND.

A number of Baltimore glass-blowers, in order to secure more regular work than they have had for some time, have resolved to form a co-operative association, and will be incorporated under the name of the Co-operative Druggists' Glassware Manufacturing Association of Baltimore City. The capital stock is \$10,000, the number of shares being 100 of \$100 each. Ground has been secured near the city at Hullville, on the Baltimore and Ohio Railroad, between

Camden Station and Mt. Winans. A building will be erected and work begun the middle of September.

## WEST VIRGINIA.

The Belmont Furnace, Wheeling, blew out on the 3d of this month.

## TENNESSEE.

The Standard Charcoal Company, Centreville, manufacturers of alcohol from wood, will erect an iron furnace to use the gas arising from distillation of alcohol in the manufacture of pig iron. They have purchased the fire-brick for the furnace.—*Industrial South.*

The La Grange Furnace went in blast July 23.

Lookout Rolling Mill, which has been shut down 18 months, has resumed work with 100 hands employed.

The Southern Machine Company, of Shelbyville, have now been in operation for six weeks, and have plenty of work to do. Their capital stock is \$18,000.

## ALABAMA.

The Broken Arrow Mines, near Coosa River, and at the terminus of the E. and W. Railroad, are now operating 62 coke ovens, and are building more. The same company owning these mines are opening a mine at Ragan, on the E. and W. Road, 10 miles from Broken Arrow.

The Mary Pratt Furnace, which blew out for repairs June 30, will go in again about September 1.

Messrs. Wharton & Co., of Montgomery, have bought ground in Birmingham for a large flouring mill.

Mr. George Peacock, of Selma, who makes a tram-car wheel after his own patent, was in Birmingham the latter part of last week, talking with the iron men about moving there, and seems to have about decided on the move.

The Louisville and Nashville Railroad's last monthly payment to the Pratt Coal and Iron Company for coal was in the neighborhood of \$12,000.

Major Hugh Carlisle having, after a long period of stubborn litigation, got possession of the 6-mile East and West Alabama Railroad, from Gadsden to Attalla, on the Alabama Great Southern, is getting ready to extend it to Guntersville, 25 miles further west, on the Tennessee River. He has a dirt-moving outfit coming from Louisiana.

The Tuscaloosa Cotton Seed Oil Company have stopped their mill for the season. They have been making 125 barrels of oil per week on an average.

The Birmingham Stove Company, which were laying the foundation for their works, have been brought to a halt by a difference between the president, G. W. C. Lomb, and the Fleishes, father and son, who are the largest stockholders and had moved from Pennsylvania. Lomb wanted pay that the others were not willing to give him for buying the ground for the works.

The stockholders of the Birmingham Cotton Factory will meet the 7th of next month to try to devise some means to pay off the debts of the concern. The mill was completed a year ago, but has never run.

The Calera Land Company, with \$500,000 capital, have been organized in Montgomery to build up the town of Calera, about 14,000 acres of land in and adjacent to the latter having been pooled with money furnished mainly by Montgomery capitalists. It is the purpose of the company to start manufactures of one kind and another. Calera is well situated for iron-making, and has good facilities for moving its products, being the crossing point of the Louisville and Nash-

## HARDWARE NOVELTIES.

## The "Excelsior" Chamfer Plane.

A very simple tool designed to make different chamfer cuts is being put upon the market by Mander & Dillin, 2613 Germantown avenue, Philadelphia, Pa. A general



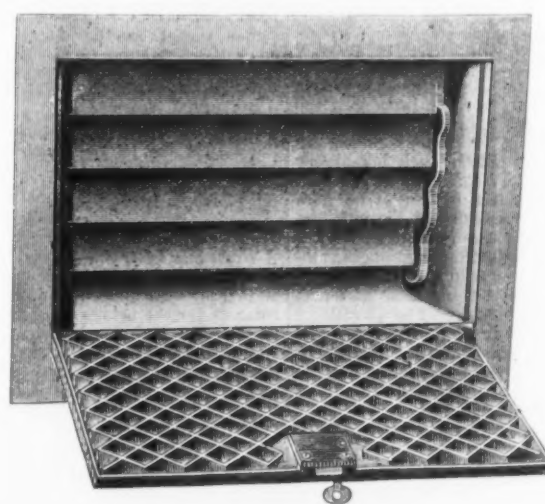
Mander & Dillin's Adjustable Chamfer Plane.

view and bottom view are shown in the cuts. The bottom of the Plane is hollowed out in the form of a right-angle notch or groove. A gauge working in front of the bit is adjustable, by which the depth of the



Bottom View of Plane.

chamfer is regulated. This gauge moves in slots and is fastened by a set-screw in the form shown in the general view. By introducing different knives and gauges to correspond, molded chamfers and various other



Tobey's Lock Register for Asylums and Jails.

forms can be produced by the same tool. In its simplest shape, as shown in the engraving, it works a stop chamfer complete, thus dispensing with the use of a chisel draw-knife or bull-nose plane. The makers direct attention to the fact that this tool can be adjusted to cut any size chamfer both in length and depth, and that the work can be done in one-tenth the time consumed by the common method.

## Forrest's Double-Headed Marking Gauge.

The engravings below illustrate a new form of Carpenter's Marking Gauges being put upon the market by the St. Paul Novelty Factory, St. Paul, Minn. The tool is the invention of George S. Forrest, of Concord, N. H. It is said to combine four different marking gauges in one handy tool. Two styles are made, one having japanned



Fig. 1.—Forrest's Double-Headed Marking Gauge.

ville and East Tennessee, Virginia and Georgia railroads. Besides having foundries and planing mills, the town burns lime extensively, the headquarters of the Southern Lime Association being there.

A metallurgical furnace, more especially designed for the utilization of natural gas, has been patented by S. T. Owens, of Pittsburgh, Pa. Under the bed of the furnace there is a chamber in which a series of longitudinal flues are arranged. Above the flues is a clear space, or dome chamber, into which the heated air rises after passing between the pipes and before being led into a

handles and the other polished brass handles. The body of the gauge forms the handle of the tool, and is provided at each end with a flange or head, as shown in the engraving. The body is grooved inside in such a way that three iron bars slide all the way through it. The larger or center bar may be laid into its place through the open slide or slot in the handle. The other two, which are smaller, are grooved half into the handle and half into the center bar, as clearly illustrated in Fig. 1. The thumb-screw D touches the center bar and thereby tightens or loosens all the bars. The bar A has a marking point, and forms the regular tenon gauge. The points E and E in bars B and C form a



Fig. 2.—Bottom View of Marking Gauge.

vertical flue. The horizontal flues are supported by the end walls and by intermediate brick piers at the joints. The piers are supported upon broad thick tiles, which in turn are sustained by piers which constitute the division walls of air flues extending under the dome chamber. The piers are composed of horizontal courses between each horizontal row of the flues, and of vertical courses between each vertical row of flues. The course of the products of combustion is from the bed through the neck to a downtake and thence through openings to the longitudinal flues, stack flue and stack.

mortise gauge. These points are set by placing the bars B and C different distances apart, as well as away from the head of the tool. The marking points F and G projecting from opposite sides of the center bar, one at each end, form a right and left, or inside and outside, gauge, very useful for many purposes. It is specially adapted to marking hinges in hanging doors, and the inventor therefore calls it the "door-hanging gauge." When the point G is set for marking upon the stile of a door the proper width necessary to be channeled or grooved for the reception of a

hinge, the point F is thereby set ready for performing a like operation upon the jamb or frame of the door, and vice versa. When any extra wide work is to be laid out the bar A may be pulled entirely out and an extra long bar put in its place. This forms what the inventor styles the "panel gauge." The marking points in the several bars are held in place by set-screws screwed flush with the surface of the ends of the bars. The length of the handle is 5½ inches, and the three bars shown in the cut are a little longer than this. The extra bars, not illustrated, are 12 inches long. The bars are polished and the handles or bodies, as already stated, are either brass polished or cast iron japanned.

## Asylum Registers.

The Tuttle & Bailey Mfg. Co., of 83 Beekman street, New York, are putting on the market Tobey's Patent Asylum Registers, the general features of which are indicated by the accompanying engraving. This register has been specially devised to meet the requirements of insane asylums, strong-rooms in jails and other similar positions. It is the invention of Dr. H. A. Tobey, the superintendent of the Asylum for the Insane located at Dayton, Ohio. The grating is hinged at the bottom and is fastened at the top by a Yale lock, which not only renders it secure, but also makes it convenient to open, as shown in the cut, whenever desired. By an upright curve in the lower part of the register, and by the overlapping fans or valves, as shown in the cut, it is made impossible to throw any liquid or other substance through the front plate so as to reach the flue. This is an important consideration in goods of this character, and will be appreciated by all who have occasion to use the same. Four

sizes are manufactured, namely, 8 x 10, 8 x 12, 10 x 12 and 10 x 14.

## The "Windsor" Hand Bender.

Messrs. C. E. Jennings & Co., of No. 96 Chambers street, New York, are putting upon the market the little tool shown in the cut printed herewith, which is known in the trade as the "Windsor" Hand Bender. This is an entirely new tool, and is designed to take the place of expensive bending planes and costly machinery, so far as is practicable for bending or molding cabinet-work and house finish. In general shape the tool may in some respects be likened to a draw knife. The cutting bit, however, is in the form of a disk, two of these being shown in the cut immediately under the tool. In each several different forms are secured, and these are brought to the cutting edge by simply turning on the spindle. At the same time the proper depth of cut with reference to the face of gauge plate is obtained in the same general manner. The manufacturers claim for this tool that it will do a great variety of work, and work that cannot possibly be produced by any other plane or machine. The tool is light, weighing less than ½ pound, and is always ready for use, a special advantage being that it will execute a small piece of work in less time than a plane of the ordinary kind can be found and adjusted. It will make beadings on curves, angles or irregular surfaces as well as on straight surfaces. It is especially recommended by the makers to all wood-workers that have occasion to bend woods of irregular



The "Windsor" Hand Bender.

surfaces. The gauge is stationary, the cutter being adjustable on either side, thus accommodating the grain of wood. The assortment of cutters that is made possible in this tool is practically unlimited, as special bits are supplied at very small cost. The cutters being in the form of flat disks, two of them may be placed in the tool at one time, and so turned with reference to each other as to form a combination bit, thus including a much larger range of patterns than would be possible under other circumstances.

The completion of the new quays at Antwerp form an epoch in the commercial history of that port. They are situated on the right bank of the Scheldt, and are over 2 miles in length. They were constructed at the expense partly of the State, partly of the Government, and cost over £4,000,000. This gigantic work has been entirely carried out by the well-known Paris contractors who constructed the Suez Canal, and who are cutting the canal of Panama. The chief engineer is M. Loiseau. These enormous and costly works have been rendered necessary by the unprecedented increase of the commerce of Antwerp, which is now the first port of Continental Europe. The total tonnage of the sea-going shipping entering this port last year was nearly 4,000,000.



### English Dependence Upon American Ingenuity.

The materials out of which an English newspaper can manufacture "another triumph for British industry" are exceedingly small in size and run few to the hill. We take the following from the *London Ironmonger*:

A few weeks ago a letter appeared in the *Ironmonger* from the pen of a gentleman writing with the authority of personal experience, specifying one or two cases in which he thought English manufacturers at fault, and animadverting upon the old—now, it should be said, extinct—habit of regarding what was looked upon as the whims of colonial consumers with regard to style and shape in tools. One instance mentioned was that of the type of shovel used by the Australian digger—a long-handled tool, with a peculiar bend and no cross-piece at the end. It was said that English makers were negligent in adapting the bend to the exact angle required, assuming that a trifling difference could not matter so long as the general structure of the tool was observed. Hitherto, it is likely enough, the criticisms passed on this particular example may have been deserved. The bend in question is unique, and considering that this special pattern was not in general use, and was not likely to be in demand outside the requirements of the diggers, English makers for some time probably did not put themselves out of the way to produce the tool in the exact shape desired. The apparatus in use for bending handles was not precisely adapted to the want of the digger's shovel, and it was a question of going to considerable expense and trouble to obtain the appliance required. In pursuance of their determination to remove every grievance in the way of their colonial trade, however, Spear & Jackson some time ago resolved to overcome this difficulty. One of the members of the firm went across to the United States for the purpose of obtaining a machine identical with that used in America for this special purpose. He met with the greatest difficulties in his quest, not only from the jealous care with which he was excluded from works where such machinery was in operation, but also through his inability to ascertain where it was to be had. Nothing balked the traveler in his purpose, however, and in the end he brought back a machine of unique construction and great ingenuity, which is now doing, with the greatest success, the very work which had presented so much difficulty. The shovels of this class which Spear & Jackson are now turning out correspond with the most delicate nicety with the patterns required by the colonial diggers, and add one more triumph to the many which the firm had already achieved in the contest with American manufacturers.

Mr. J. Hilditch, of Norway, whose address is at the Norwegian Consulate, 41 Broad street, New York, is introducing in this country a very clever and practical device in the shape of an automatic mechanism for shades and blinds. Unlike the self-acting rollers in general use, this device is separate from the roller and controls its movements by a cord. The spring and ratchet upon which the self-acting principle depends are contained within a brass case almost as large in diameter as a silver dollar, and  $\frac{1}{4}$  inch thick. This is secured to the window frame by a screw, upon which it freely turns, making it a wheel upon the grooved circumference of which the cord winds. The other end of the cord coils around a spindle on the end of the shade roller. The tension of the cord when the spring is released by throwing the pawl out of the notch in which it falls when at rest is sufficient to wind the shade up when lifted by hand. In pulling the shade down the pawl offers no resistance. Its operation is identical with that of the automatic shade roller, but the device is very much cheaper, and it has the advantage of being applicable to any form of roller in use, as well as to Venetian blinds and other window coverings. Its portability is also an advantage, as the mechanism fits one window as well as another, whereas an automatic roller cut to length can never be used on a window wider than that to which it was originally fitted.

Respecting certain changes now taking place in our foreign mail service, a Washington telegram says: "It has been learned beyond doubt that the Pacific Mail Company have not only refused to carry the mails upon the terms proposed by the department, but that they have attempted to embarrass the Government by preventing the carrying of the mails on other lines. The Atlas Line offered to carry the mails to the West Indies refused by the Pacific Mail Steamship Company, but the Pacific Mail insisted that the mails should not be carried by the Atlas Line, under an alleged agreement said to exist by which the Atlas Line agreed not to compete with the Pacific Mail, as it would do if it carried the mails as freight. This is taken as proof almost conclusive that the Pacific Mail, failing to compel the Postmaster-General to distribute the appropriation as they dictated, were determined to prevent the mails from being sent at all. Now that the Cuban mail is going by rail and steamer by way of Florida, it is found to be greatly to the advantage of all correspondents in this country and Cuba, as the connection is more frequent and quicker, and a return would not readily be made to the steamship dispatch."

A number of English and Scotch gentlemen, one of whom is at the head of a large gas-manufacturing company in London, have been visiting canal-land in Kentucky recently purchased by them. The coal they will ship to England, and use it in the manufacture of gas. Mr. Corey, who is said to be one of the largest coal producers in England, is sanguine over the success of the scheme. "Already," he says, "our gas is supplanting electric lights as an illuminant. It is much cheaper than electricity, and gives a clearer and more powerful, though not so dazzling, a light. We can mine our coal here, transport it to England and manufacture gas and yet give a cheaper light than the electric companies can furnish. We can do this with no other coal but the

canal, but the deposits of that coal in England are limited and nearly all under our control. We expect to open up our mines within two months now, and shall immediately commence shipping."

### Austrian Mineral Statistics.

The more important items of the mineral production of Austria during 1884, compared with that of 1883, are:

Product in 1884.	Increase or decrease as compared with 1883.	Value in 1884.	Increase or decrease as compared with 1883.
Gold...	Kg. 27,077	Florins. 8,829	Florins. 34,115
Silver...	34,564,578 d'ble cwt.	2,390,456 d'ble cwt.	3,105,740
Iron...	5,306,210 d'ble cwt.	172,300	23,728,730
Zinc...	37,380	630,308	587,556
Copper...	6,814	1,007	472,257
Lead...	85,119	2,805	1,396,043
Lignite...	100,086,528	1,547,876	18,081,618
Coal...	71,908,656	32,305	22,777,508

The production of salt during 1884 was 533,955 double cwt. of mineral salt, 1,588,805 double cwt. of boiled salt, 270,318 double cwt. of sea salt, and 248,637 cwt. of salt for agricultural and industrial purposes. The total production of the salt works represented a value of 22,236,240 florins; that of the mines, 49,903,842 florins, and that of the metal works, 31,733,183 florins. The mines and metal works give employment to 113,277 persons.

Edgar W. Emmons, Clarence W. Emmons and John N. Roach, composing the firm of Emmons & Roach, doing business at 130 to 134 Cedar street, made an assignment on Monday for the benefit of creditors to Francis H. Tobin, without preferences. Mr. Frederick Lewis, representative of the assignee, stated that the failure was due to the general depreciation in the iron trade; that the creditors of the firm had been pressing their claims, threatening to sue, &c., and that attachments had been placed upon the firm's mill property in Pennsylvania. Mr. Lewis said the junior member of the firm was a grandson of John Roach, the ship-builder, whose failure had greatly excited the firm's creditors.

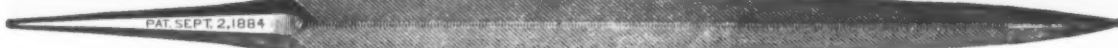
Work has been commenced on the bridge to be built in Philadelphia for the Baltimore and Ohio extension. One of the timber caissons for the bridge piers is nearly ready to launch. It is in the form of an octagon, about 30 feet in diameter, with solid timber walls 3 feet thick, which are calked with oakum until perfectly airtight. This will be sunk by the pneumatic process and built up as it sinks. It will be, when completed, 90 feet high, and will be filled with cement and pounded stone. The engines used to pump air into the caissons during the progress of the work have arrived and will be set up at once. The work is being done by Charles Sooy Smith & Co.

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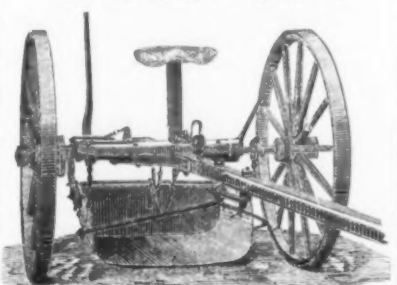


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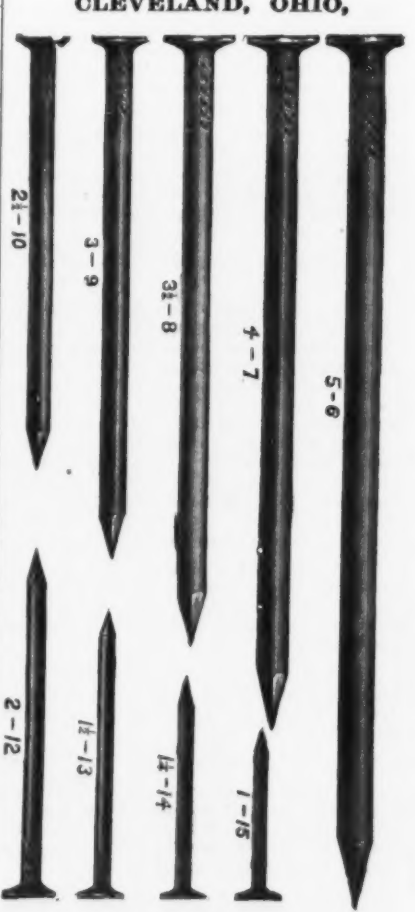
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## Unfortunate Inventors.

One of the saddest tales in the history of invention is that of Eli Whitney and the cotton gin. Whitney was a Massachusetts man and went to the South as a school teacher. He displayed remarkable inventive genius from an early age, and was a constant source of anxiety to his worthy father, who, when he saw him always engaged in making some toy, imagined he was never destined to amount to much. The invention of the gin was the result of the Southern visit and of his observation of the time lost in separating the seed from the lint. To separate a pound was a full day's work for a woman, and consequently cotton was little used. After much labor Whitney perfected his machine, but the experience of other inventors who had generally found the utmost difficulty in introducing their ideas was not his, for the people of Georgia had so high an appreciation of the value of the invention that they broke into his room and stole his models, carrying them off and using the idea to make other machines. A number of patents were issued, the machines each varying a little from each other, but all having Whitney's idea, and for the invention he never realized anything but lawsuits. After carrying on these fruitlessly for a number of years, he gave up the effort to recover either remuneration or damages, and applied himself to the invention of machinery to make arms for the Government. In this he did well, but from his wonderful invention, which gave the South its leading industry, he received little or nothing.

David Bushnell was the inventor of submarine warfare, and was born in Connecticut in 1742. He first showed that, under proper conditions, powder would explode under water, and, proceeding little by little, he invented a boat which might be used in affixing torpedoes to the hull of an enemy's ship. The boat was constructed to run under water, and appears, from the descriptions, to have been a primitive affair, so that it is somewhat remarkable that any one would risk his life in its management. But a man was found who undertook to blow up one of the English men-of-war in New York harbor during the Revolution, and nearly succeeded. Bushnell's torpedoes were regulated by clock-work, which, after running a certain time, struck a flint and steel on a mass of powder. His idea was not at all encouraged, the notions of that age being that such fighting was murder, and, notwithstanding all his ingenuity, Bushnell reaped no reward.

His story is also that of Amos Whittemore, the Massachusetts man who invented the card machine. Cards for carding wool were before his time made by hand; the process was very tedious, and the cards proportionately expensive. A card-maker by trade, he conceived the notion that the process could be cheapened by the use of machinery, and, after many years' steady labor under the most discouraging circumstances, poverty and sickness combining to dishearten him, he finally succeeded in perfecting a machine that prepared the sheet of leather, pierced it with holes at the proper distances, took the wires from the reels, cut it at the proper length, inserted it in the holes already prepared, bent it, and turned out the card complete. Unlike most inventors, Whittemore did not die in poverty, but, after a number of years of exceedingly hard struggle, he finally sold a sufficient interest in his invention to keep soul and body together, and thus was enabled to end his days in comparative comfort.

One of the most ingenious men that ever lived was a Massachusetts man named Jacob Perkins, born in 1766. The list of his inventions comprises a peculiar die for coins, devices for preventing the counterfeiting of bank bills, a bathometer to measure the depth of water, a plometer to measure the speed of a moving ship, many improvements in hardening and softening steel at pleasure, and a steam gun that could discharge 250 balls a minute. From natural ill-luck or from some other cause he never had any success in making money out of any of his inventions. Even his celebrated nail-making machine, which made nails and completed them, head and all, at a single stroke, bringing him nothing but law suits. His steam gun promised well, and seemed to be effective, but was unanimously condemned by officers of the English, French and American armies, for the reason that men under excitement of battle cannot be made to use properly any machinery that is in the least intricate or requires even ordinary adjustment. So Perkins made only reputation by his inventions, though in his day he had an abundance of that, and 40 years ago his name in this country and in England was synonymous with ingenuity. But he lived and died poor, though his nail machine enriched many manufacturers and was one of the most notable inventions of his or any other age. Akin to the nail machine and with a similar history is the tack machine invented by Thomas Blanchard, also a Massachusetts man. In his day tacks were made by hand, the operations of making and counting them being very tedious. He invented first a counting machine that counted the tacks for him, and then devoted the best years of his life to the invention of a tack-making machine that, when finished, was of such perfection that a thousand tacks could be made with it, the thousand exactly balancing a half-ounce weight. His machine was sold under a stress of poverty for \$5000 and enriched the purchasers, while the sum received did not enable him to pay debts contracted in the work. He was also the inventor of a lathe to turn the barrel of a musket of uniform size throughout until the breech was reached, when by a curious device the motion was entirely changed and the flats and ovals needed were cut by the same machine. His attention being thus directed toward firearms, he proceeded further, inventing from first to last no less than 13 different machines for making the various parts of the gun. None of his inventions, however, paid him anything proportioned to the time and labor expended on them, and his life was passed in very moderate circumstances.

The misfortunes that attend inventors seem to have no respect for rank, since the real inventor of the steam engine, the Marquis of Worcester, was no more exempt

from them than if he had not worn a title. He was born in 1597, and lived the most of his life either in exile or in the Tower, the family fortunes being completely ruined by the civil wars of that age. His inventions are recorded in a book written by himself, called the "Century of Inventions," each invention being particularly described and its objects clearly stated. Among the hundred devices of which he was the inventor there is one which distinctly entitles him to be regarded as the inventor of the steam engine. It was intended to be used as a steam pump, and designed for the mines, which even at that time were sadly in need of means for raising the water which continually checked the progress of the workmen. But it was too far in advance of the age, and, though a special act of Parliament was passed to secure to Worcester for 90 years all the benefits arising to him and his heirs of the various inventions he had perfected, his widow was denounced as insane when she attempted to introduce the steam engine after his death, and was actually remonstrated with by a priest as being instigated by the devil. Worcester lived in great poverty, and, so far from realizing anything from his inventive genius, appears to have been under the constant suspicion of his neighbors, who fancied he was in communication with the devil.

No invention of modern times has done more for the industrial world than the spinning mule. Before its day few English spinners could make hanks of greater fineness than 200 to the pound, the hank being 840 yards, while the natives of India could seldom exceed 400 hanks of the same length. By means of the improvements made in spinning by the application of the mule, thread has been spun so fine that a pound was 4770 miles in length. The mule was the invention of Samuel Crompton, a poor yarn-spinner of Lancashire, England, who devoted his life to it, and finally had the mortification of seeing his machine appropriated by every one who wanted to use one, and while others made fortunes he lived in poverty. In his old age he made a tour on foot through the spinning districts of England, Scotland and Ireland, to ascertain how many spindles were at work on his mule principle, and found the number between 4,000,000 and 5,000,000. On the basis of this information, he induced some friend to introduce a bill in Parliament for his benefit, and in 1829 a grant was made to him of £5000. He then attempted to establish his sons in business, but they soon squandered all the funds he had, and a number of years after this misfortune a small subscription was taken up for him by spinners working with his machine, and an annuity of about \$300 was purchased, on which he managed to exist the remainder of his days. He died in 1827.

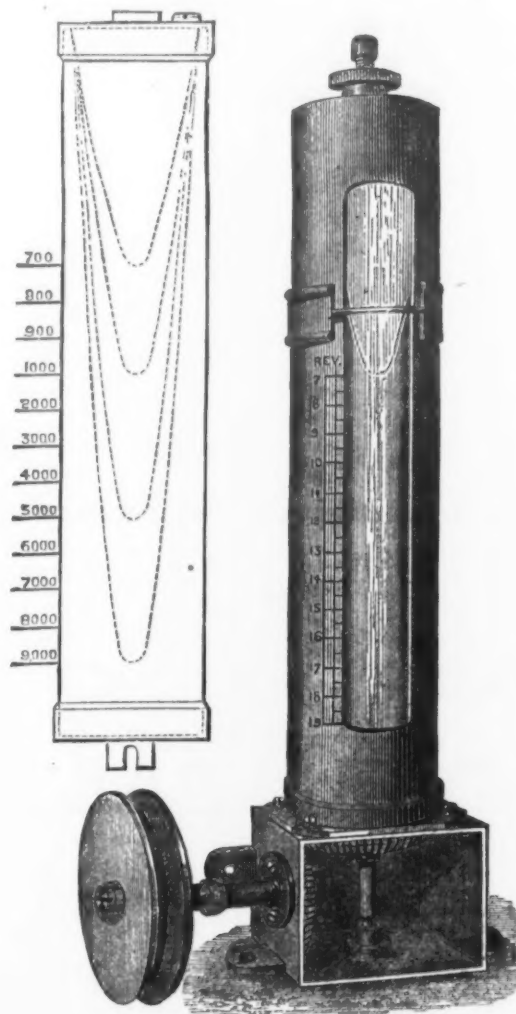
The inventor of the telescope is too well known to need mention, but with the instrument as we now have it is inseparably connected the name of M. Guinand, a Swiss glassmaker, who made it possible to have telescopes of large size and great magnifying power. Before his time it was practically impossible to cast glass in pieces of sufficient size to make large lenses, 6 or 8 inches being the limit. By the use of certain fluxes even yet imperfectly known, and by the adoption of peculiar furnaces and crucibles, he succeeded in obtaining perfectly homogeneous disks of glass of 12 and 18 inches in size. He died in 1823, at the age of 80, having reaped no advantage from his inventions, though by them the heavens were really first opened to the gaze of the astronomer. The inventor of the power loom was, strange to say, a literary man named Edmund Cartwright, born in 1743. He was a Fellow of University College, Oxford, and for the first 40 years of his life was not known to have mechanical tastes. Chancing at that time to fall in with gentlemen who were discussing spinning machinery, he observed that Arkwright ought to turn his attention to the invention of a machine that should weave. They contended that it was impossible, when he replied that he had seen an automaton that could play chess, and did not see why a weaving machine was not quite as much within the bounds of possibility as that. The idea remained with him, and without ever having seen a loom he went to work to produce a machine that should weave. He did so, and from the time his patent was taken out in 1785 to the time of his death in 1823 he was constantly engaged in mechanical invention, some of his contrivances not only being still in use, but never having been improved on since he sent them out into the world. But all the money he derived from the sale of his machines and of the rights to use his inventions did not more than suffice to pay the debts he had contracted, and he died poor.

The spinning jenny was the invention of James Hargreaves, an illiterate weaver of Sandhills, England, who conferred an inestimable benefit upon the world by his invention, but so little was it appreciated that, when his fellow-weavers saw the efficient work done by it, they mobbed him and destroyed his machine, while he fled for his life. The importance of the invention being recognized in time, the manufacturers began to use it despite the objection of the weavers, but Hargreaves received nothing for his labor, though he had taken out patents, which, owing to his ignorance, were imperfect and easily evaded. The framework knitter was the invention of a clergyman named Lee, who constructed the first machine about 1600. He tried to introduce it in England, and actually made a pair of stockings in the presence of King James I, but this narrow-minded monarch considered the frame a dangerous innovation, calculated to throw the poor out of employment, and Lee took his invention to France, where he was in a fair way to become wealthy when he was proscribed as a Protestant, and forced to hide in Paris, where, in an obscure lodging, he died. The inventor of the iron plow was a humble Scotch blacksmith named William Allan. His modesty was so great that, after he made the first plow and it did satisfactory work on his own farm, he declined to make another for a neighboring gentleman on the plea that he was not as good a blacksmith as the gentleman ought to have, and recommended a neighbor of his named Gray. The latter became rich at the business, while Allan remained as poor as

ever, though before his death his style of plow was in use all over the United Kingdom.

## A Novel Speed Gauge.

A simple and cheap instrument recently brought out in England for reading the speed of dynamos or other quick running machinery is shown in the annexed engraving. It is the invention of Mr. Killingsworth Hedges, London, England, and is a decided novelty in its line. It is termed the "Vortex" indicator, and is simply a removable glass tube revolved in a metallic case which is furnished on its outside with a sliding ring. The tube being partly filled with water, when revolved the water has a tend-



HEDGES' NEW SPEED INDICATOR.

ency to creep up the sides of the glass, carrying the air down in a parabolic form, which is elongated as the speed increases. The bottom of the bubble gives the speed, which is easily determined by getting the two fine wires of the sliding ring in line, the revolutions being marked on the case. The instrument has been investigated mathematically, and a formula has been devised by which the angular velocity of the water which causes the depression for any given speed can be ascertained without experiment. The depression is always proportional to the speed, so that the calibration of the instrument is far simpler than in those other forms of speed indicators in which the ordinates vary with the increase of speed. Mr. Hedges' instrument, we believe, is unlike all others in having the divisions at equal distances, and will doubtless prove of value in practical work.

## Some Tall Chimneys.

Chief Inspector R. K. McMurray, of the New York department of the Hartford Steam Boiler Inspection and Insurance Company,

Owners' names.	Where located.	Form.	Material.	Height above ground.	Remarks.
Townsend's Works.....	Pt. Dundas, near Glasgow, Scotland.	Circular.	Brick & stone.	454	Highest in the world.
Messrs. Tennant & Co.....	St. Rollox, near Glasgow, Scotland.	Circular.	Brick & stone.	435	
Messrs. Crossley's.....	Hallifax, England.	Octagonal.	Stone.	381	Dean Clough Mill.
Edinburgh Gas Light Co.....	Edinburgh, Scotland.	Circular.	Stone.	374	Cost \$25,000.
Messrs. Brooks' Fire Clay Works.....	Huddersfield, England.	Circular.	Brick & stone.	306	
Messrs. Mitchell Bros.....	Bradford, England.	Octagonal.	Stone.	300	
W. Cumberland Hematite Works.....	Cumberland, Eng.	Circular.	Stone.	251	
Clark Thread Company.....	Newark, N. J.	Square.	Brick.	136 9-foot flue.	
Crescent Works.....	France.	Circular.	Iron.	*197 10 ft. at bottom, 4 ft. 3 in. at top.	
Crescent Works.....	France.	Circular.	Iron.	*279 22 ft. 11 1/2 in. bottom 7 ft. 6 in. at top.	

\* This stack was riveted together horizontally, and lifted into its place with a crane.—82 tons.

† Weight, 80 tons; cost, \$8000.

## COMPARE

	Feet.		Feet.
Townsend's Works, stack.....	454	St. Nicholas, Hamburg.....	478
St. Peter's, Rome.....	425	Cathedral, Cologne.....	511
Notre Dame, Rouen.....	465	Washington Monument.....	555
Cathedral, Strasburg.....	498		

To which we may add:

Merrimack Mfg. Co., Lowell, Mass.....	285 feet high—12-foot flue.
Tremont and Suffolk Mills, Lowell, Mass.....	250 feet high—10-foot flue.
Tremont and Suffolk Mills, Lowell, Mass.....	238 feet high—Rectangular—not square.
Lawrence Mfg. Co., Lowell, Mass.....	225 feet high—8-foot flue.

has compiled the accompanying interesting table of high chimneys, which appeared in the *Locomotive* several months since.

A special effort is making in London on the part of the various colonies to organize colonial trade sections in the London Chamber of Commerce, in order that the trade relations of the Empire may be more effectively developed. A few days ago the newly-formed Australian section held their first meeting in the city, Sir William McArthur, M. P., in the chair.

## SCIENTIFIC AND TECHNICAL.

## The Manufacture of Oxygen.

The chemical wonder of the London Inventions Exhibition is said to be the manufacture of oxygen by the process of Brin Frères. They have made what is really an artificial mineral lung of anhydrous oxide of barium, and with this, by an ingenious process, they simply take up the oxygen from the atmospheric air. First, the air is drawn by means of a partial vacuum through a vessel of quicklime, which absorbs all the carbonic acid and moisture, and reduces it to a mixture of oxygen and nitrogen. These gases are then drawn into the retorts, heated at 500°, and the artificial lung ab-

success of this experiment has led to a further step being taken in the same direction, and we now have an excellent example of an important electrical mineral line. This line is now in operation at the Paulus-Hohenzollern collieries, in Upper Silesia. The line, which is 800 yards in length, has been constructed for a traffic of 500 tons of coal in 10 hours. This result Messrs. Siemens and Halske have guaranteed. The electrical locomotive weighs 2 tons; it is controlled by a specially devised regulator, which is said to give great satisfaction to those in charge of the train by its prompt and certain action. The insulated conductor consists of flat iron bars, galvanized at the ends and connected by means of fish plates. This conductor is suspended from the roof upon insulators. Brushes on the locomotives take the current from the conductor. The line is connected with the generator by cables about 250 yards long. The generator is driven by a belt from the fly-wheel of the engine. The trucks weigh 10 cwt. each, and have a capacity of 11 cwt. The train is composed of 15 trucks, so that the useful load hauled is a little over 8 tons, and the whole load nearly 16 tons. With this load a speed of 7 1/2 feet a second is reached. With an empty train the speed is 12 feet a second. At present the output is not sufficient to require the maximum transport of 500 tons a day.

## Toughened Glass in the Laboratory.

The results of 11 months' use of toughened glass beakers are thus summarized by Mr. R. F. Friswell, in a paper read before the Chemical Society: "Of 20 beakers, two burst spontaneously, = 10 per cent.; one burst on hot water being poured in, = 5 per cent.; six became useless from fissures and enfilade, = 30 per cent.; eight are in good condition, = 40 per cent.; three have been broken by unknown means, = 15 per cent. Taking into consideration the loss of confidence caused by the high percentage of spontaneous bursting, it may be said that toughened glass is a complete failure in the laboratory."

## Signaling from Balloons.

An invention which it is anticipated will be of importance in future warfare was recently exhibited in the grounds of the Albert Palace, London, by Mr. Eric S. Bruce, the inventor. It consists of the application of electric lighting to balloons, by means of which signals may be flashed at night over very wide areas. Before giving a practical demonstration of the working of his invention, Mr. Bruce delivered a brief lecture in the concert hall of the Albert Palace, in which he stated the results of his experiments and explained the manner in which he had arrived at them. The invention consists of an ordinary balloon made of a material as translucent as possible (in the case of the one at present on exhibition the material is cambric) in which are fixed a number of incandescent lamps. The balloon is a captive one, and the rope which secures it is also utilized for conveying the electric current to the lamps inside the balloon. The Morse system of telegraphy is employed for the signaling, which illuminates the balloon with flashes of light of longer or shorter duration. The invention dates back only two months, and the experiments were made with a large balloon for the first time recently, and were completely successful. It is proposed to continue the exhibitions of signaling for a month. The chief obstacle to be overcome in introducing the electric light into the balloon was that occasioned by the highly inflammable nature of the gas with which the balloon is inflated. This has, however, been successfully surmounted. During the evening several sentences, including "God Save the Queen," "Rule Britannia" and "Health and Happiness to Princess Beatrice," were flashed from the balloon.

## An Automatic Bichromate Battery.

An automatic bichromate battery has recently been produced by Messrs. Woodhouse & Rawson, the dimensions of which are only 7 1/2 x 1 1/4 x 8 1/2 inches, and weight 6 pounds. One charge will light a five-candle power lamp for about two hours. The electrodes are attached to an ebonite plate supported in position over the liquid by the upper edge of the containing case, within which is placed a more shallow case, constituting the liquid reservoir. The reservoir itself is free to move up and down without any possibility of disarrangement, and rests upon a small roller connected with a lever at the bottom of the case. By moving this latter the liquid reservoir is raised, and its contents "immerse" the electrodes. A ratchet arrangement prevents disconnection being made until the battery is out of use. By this arrangement, requiring the use of one hand only, an accurate regulation of the electrodes can be obtained. Further, it is easy, when using ordinary bichromate solution, to raise or lower the liquid reservoir from time to time while the battery is in use, and so displace the gas which gathers upon the surface of the electrodes in consequence of their polarization.

## The Spectrum of Iron.

Professor Thalén, whose classical researches on the spectra of the metallic elements have won for him such wide renown, has recently published a new memoir on, and a revised list of, the lines of iron, presented to the Royal Society of Upsala, last September. The new work has been done by means of a graminé dynamo, and much higher dispersion than that employed in 1864. An upper carbon pole being rejected on account of the spectrum of "acetylene," about which we have heard so much in this country, and which we now know to be due to carbon vapor, three tubes of iron 15 mm. in external diameter were used to prevent fusion of the points. The size of the laboratory did not permit the use of a lens, but the poles were placed in a horizontal position. The spectroscopic employed had six and sometimes nine prisms of flint of 60°, the focal length of the object glasses of collimator and telescope being 81 cm., and magnifying power 62. The wave lengths have also been redetermined by a process which gives.

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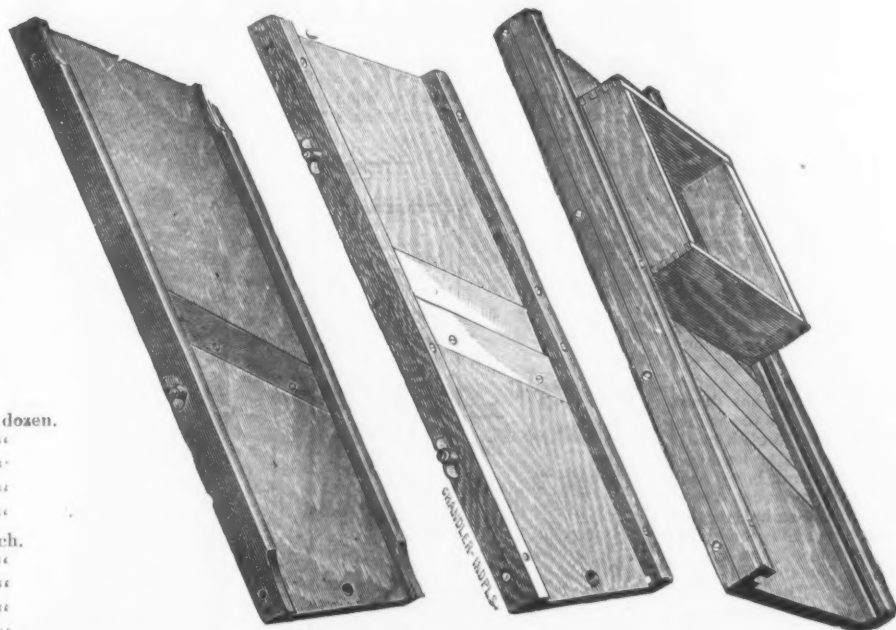
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" 4.....	4 " " "
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" 7.....	3 " " " "
" 8.....	4 " " " "
" 9.....	3 " " 12 x 40, "
" 10.....	4 " " " "



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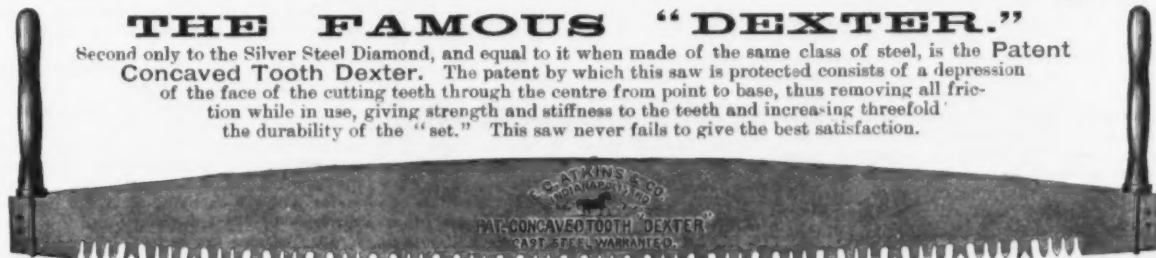
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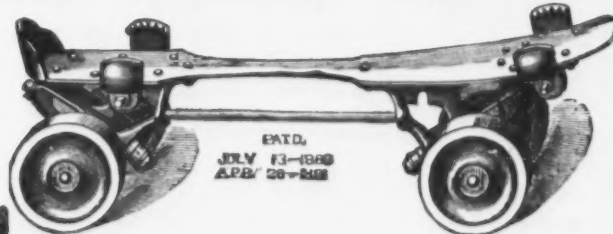
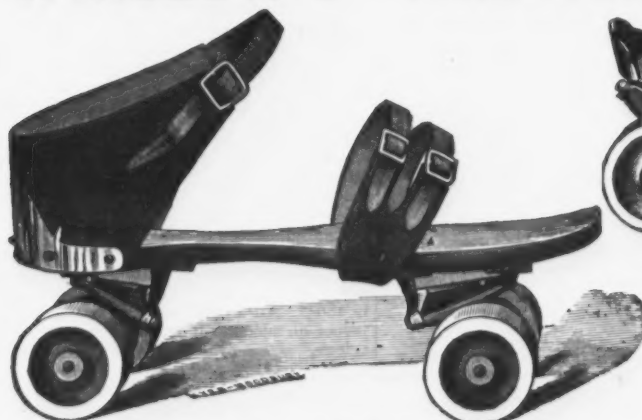
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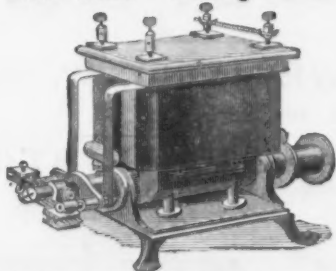
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### The Struggle for the China Trade.

English newspapers are getting excited over the competition of other nations in the China trade. The *China Mail* of recent date has the following extracts from various papers, showing the condition of the trade: "Advices from China, we are informed," says the *Times*, "express surprise at the lack of business enterprise on the part of British manufacturers or locomotive engines, rolling stock and railway material, compared with that shown by their German competitors, who have, it is reported, dispatched agents to all parts of the Chinese Empire with models and patterns, in search of orders. The last two loans floated in London are believed to be the forerunners of a series of similar operations, the proceeds of which are to be devoted to opening up the country by means of steam communication, and the enterprising Germans are apparently determined to be the first in the field if they can." The *Daily Telegraph* also has the following in its money article, which we reproduce in order to endeavor to arouse our manufacturers to enter into healthy competition in a field where they have previously taken the lead entirely: "In connection with the loud complaints heard as to the depression of trade it may be interesting to note that the advices just received from China allude to the culpable indifference shown by English manufacturers to the opportunities for extending their business in that Empire which have been created since the conclusion of peace with France. Taking for granted that China will ere long be opened up by railways, and, in anticipation of the first steps, representatives of leading German firms, such as Krupp, of Essen, and others nearly as celebrated, are, it appears, now busy securing concessions, taking contracts for rails, machinery, &c., and in various ways establishing in China a foothold which their own energy and ingenuity and the ever-watchful diplomacy of the German Empire may be trusted to render permanent. The process is similar to that which the Germans have found so effective in Japan, and will doubtless, unless checked, have similar results. The last number of *Kuhlow's Trade Review* contains, among other notices of German progress which are not very pleasant reading for an Englishman, a paragraph on trade with Japan, stating that a large contract for railway material, locomotives and wagons had fallen to Düsseldorf and Deutz firms, and adding: 'This is said to be the first consignment from Europe to Japan, and it is very noteworthy that German manufacturers have secured two contracts in the face of British competition, which is driven out of the field in that distant island Empire. The railroad system of Japan has attained a length of 225 miles, and is increasing steadily.' If English producers have not utterly lost heart under prolonged depression they will take warning by such experiences, unless they are content to see the best of the Chinese trade pass into the hands of their rivals."

This is a matter that we have repeatedly brought to the attention of our readers, and now that it has been more generally taken up we trust that some further signs of wakefulness may be exhibited. Our Shanghai correspondent has frequent called attention to the matter, and in order to emphasize its importance we reproduce one or two sentences from the letter which appeared in our last issue. After pointing out that at last one firm had engaged the services of a competent Chinese speaking European to travel in the interval for orders, he states: "Herr Krupp is distinguishing himself in the way of railroading. Miniature models of railways and railway plant have already arrived. These things are real jewels in the way of models. Silver or nickel-plated all over, they are not likely to rust, and when the introducer of these things to the Chinese has to hand them over to the Chinese magnates to examine he need not fear to incur the displeasure of a viceroy for having caused him to soil his costly furs on a rusty model. Mining and railroading must come, and the first in the field are the likeliest to reap the laurels. Surely British manufacturers can do something to earn their share of the work that will undoubtedly be done in the near future."

Writing by the mail from Shanghai, May 20, the correspondent of the *London and China Express* says: "Mining industries in North China are about to be revived, it appears. I am told that a gentleman who speaks Chinese has secured a good order for machinery, and is putting the affair through one of the mercantile firms here that has a house in London. Coal and iron are known to abound in the north, and are also said to be of prime quality. The country is so densely populated that coal for local consumption alone ought to be a paying article, let alone the prospects of consumption at a distance in the near future when the railroads that are now being constructed for are made. Rumors are afloat that the first railroad contract has already been issued, but I am not informed to whom it has been given. The Germans are the likeliest to get such things, as they are enterprising people and deserve success. Agents are not charged for catalogues. Even working models are sent out free of charge, so that agents get every possible encouragement from German and American manufacturers to push their respective productions. When will our manufacturers become liberal enough to do so? They appear to be liberal enough in some things, but in the matter of getting contracts that will furnish employment for the starving workmen they appear to be exceedingly stingy, to say the least. A native official was going about the settlement the other day wanting to buy 2200 breech-loading rifles, such as those used by the foreign soldiers in Hong Kong—i. e., Martini rifles. No one could give him any idea of the price of such things, much less give a sample. Annoyed at this, he went to a German firm, where he found scores of models of every kind of modern arms and ammunition produced in America and Germany. The result of this was that he selected the American Kennedy repeating rifle as the article that would suit him. The Mausers were considered too heavy—and they are certainly clumsy arms in comparison with Martini-Henry rifles. Orders

for warlike stores are usually big affairs—tens of thousands of tons at a stroke and sure money, one-third being paid in advance on signing the contract, the balance on delivery. I am assured that Messrs. Russell & Co., the leading American firm in China, have now employed two foreigners who speak Chinese, to look after such specialties as railway contracts, steamers, war materials and mining machinery. One of Messrs. Russell's interpreters is Mr. Petibick, formerly United States vice-consul at Tientsin, and foreign secretary to his excellency Li Hung-Chang. This gentleman's services have not been obtained for nothing. Petibick is to remain at Tientsin. Another interpreter is Mr. Müller, a German, formerly clerk in a mercantile firm here. He is stationed at Foochow for the present, but is to canvas in all the southern ports, I believe, during the present excitement about railway building at least. Messrs. Schmidt & Co. have one interpreter at Tientsin and another at Canton, and there are one or two others at Tientsin in the employ of some other firms.

### NEW PUBLICATIONS.

THE COMPLETE PRACTICAL MACHINIST. By Joshua Rose. Size 5 x 8 inches, 431 pages. Thirteenth Edition. Published by Henry Carey Baird & Co. Price, \$2.50.

The present edition has been thoroughly revised and in great part rewritten, and such portions added as were necessary to bring the book up to date and include the latest practice. The popularity of the book is shown by the fact that the present is the thirteenth edition, and in a work of this kind, that necessarily appeals to a limited class, such a large demand is a more than ordinary testimony to the worth of the book. The book is divided into 21 chapters, and deals with lathe-work, visework, drills and drilling, taps and dies, hardening and tempering, the making and use of tools, tool grinding, marking out work, &c. The concluding chapter is on pumps, and briefly refers to the several kinds in common use. All the subjects are treated fully and clearly, and by aid of the numerous illustrations an exact idea can be gathered of the methods and tools described.

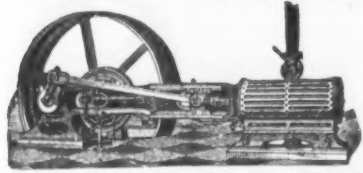
THE WINDMILL AS A PRIME MOVER. By A. R. Wolff. Size 6 x 9 1/4 inches, 159 pages. Published by John Wiley & Sons. Price, \$3.

If for no other reason, the scant literature of windmills would alone be almost sufficient to secure a favorable reception for Mr. Wolff's work, and when we find the treatment of the subject, moreover, to be thorough and interesting, as in this case, popularity among engineers may safely be predicted for it. In attempting to convey an idea of the general character of the book we can scarcely improve upon the prefatory note of the author, in which it is stated that the aim in preparing the work was to present in one treatise a consideration of the more important features of windmill theory and practice, sufficient to enable the engineer and the user to decide as to the actual state of windmill construction, its history and progress, its probable direction of development, and the degree of economy attained as compared with that of other prime movers. Mr. Wolff has had ample opportunity in the course of professional work to pay close attention to the theory and practice of windmill construction, and has thus been enabled to present much valuable original matter. The book is fully illustrated, carefully indexed, and arranged throughout in an attractive manner.

THE PHRASE. A Monograph. By F. G. Morris, M. A., Associate Professor of Chaucer at University College of Photography. 16mo, cloth, red edge, 72 pages. Published by the author. Price, 55 cents.

This little work purports to be a scientific exposition of shorthand phrase writing. The author goes into his subject in a somewhat elaborate manner, and inquires into the construction of sentences and determines their elements very much after the manner of analytical grammarians. Upon the analysis thus established he bases a few fundamental principles applicable in phrase writing, and supposed to be useful in all the various modifications of Pitman's phonography, now in general use. The author disclaims any attempt to supersede any of the phrase books which have heretofore appeared. He describes these as being for the most part phrase lists, giving more attention to the practical methods of writing phrases than to the principles upon which successful phrase writing depends. There are no shorthand characters in the book. Practical examples are made impossible from the fact that the author attempts to present principles that may be used with various systems. The absence of illustrations deprives the work of much of the usefulness that it might otherwise possess. In style the author, while perhaps not liable to the charge of verbosity, is unfortunate. He fails in many cases to go directly to the point or to state his conclusions explicitly, requiring unusually close attention upon the part of the reader to follow him at all. This, it would seem, must go far toward offsetting the practical utility of the work. Of the scholarship of the author or of his intimate acquaintance with the subject upon which he is writing there can be no doubt. In fact, the reader is impressed with the unusual resources at his command. The author's aim, as he declares, has been to oppose the estimation, too commonly indulged, that shorthand is a mere trick, and to show that, besides its great practical utility, it has high scientific value, and that, other things being equal, its most intelligent practitioners will also be the most expert. The book is the result of 20 years' practical experience, both as a writer of shorthand and as a teacher of the art of shorthand writing. The volume is a desirable addition to the literature of shorthand, and its careful study will no doubt prove of advantage to all who give it attention. It would have been of more practical benefit to shorthand writers in general, however, had it been constructed upon a lower plane, and not written, as at present, somewhat above the taste, if not above the actual comprehension, of the average writer. The work is accompanied by a very carefully prepared index, so arranged that anything may be readily found.



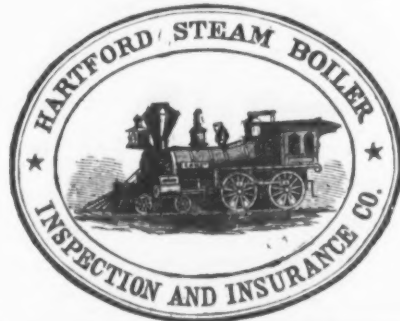
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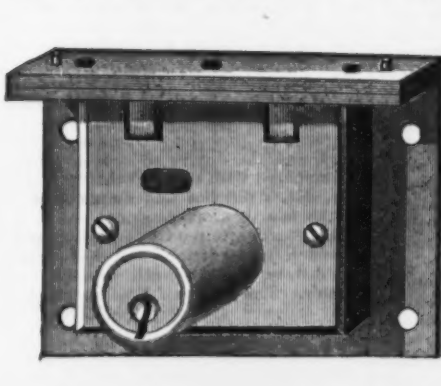
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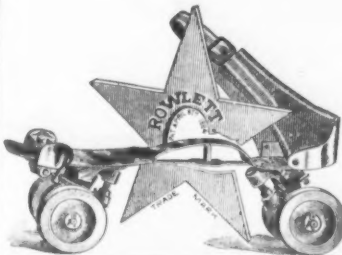
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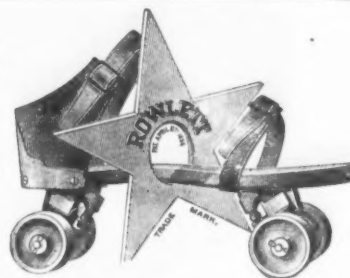
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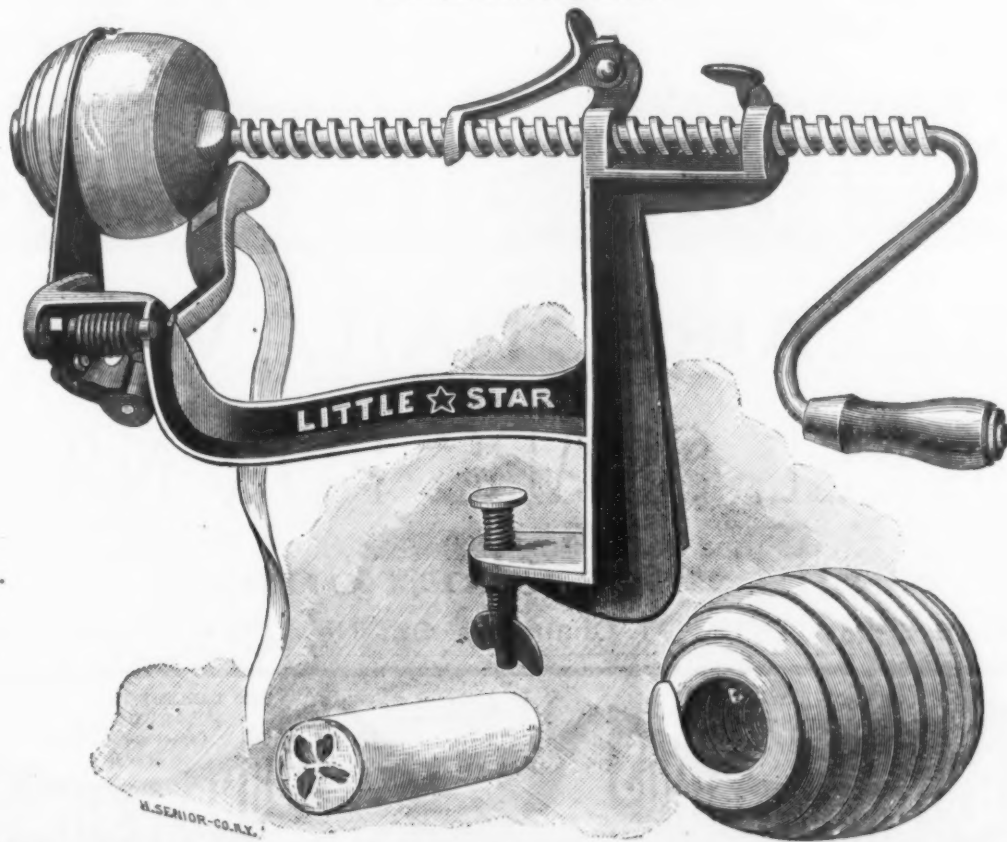


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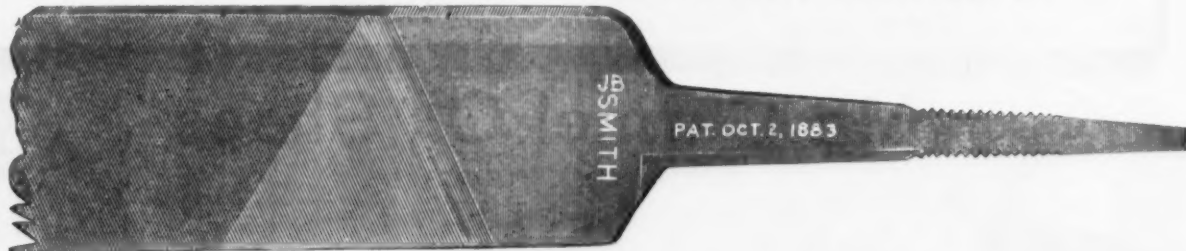


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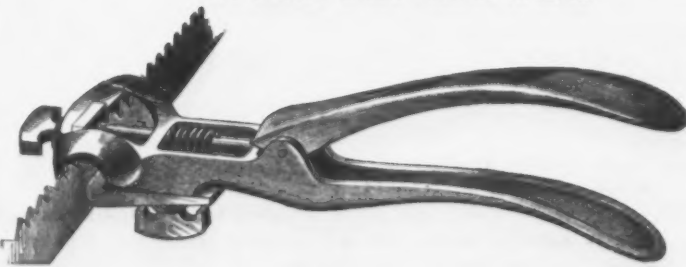
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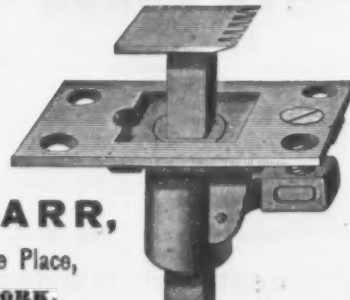
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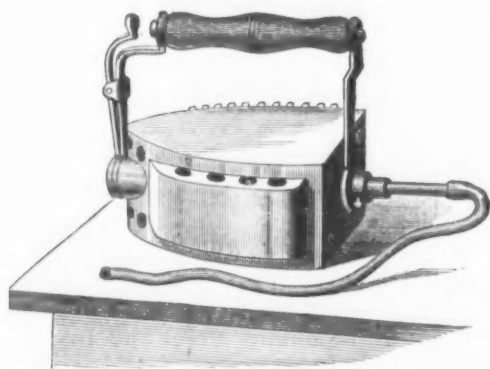
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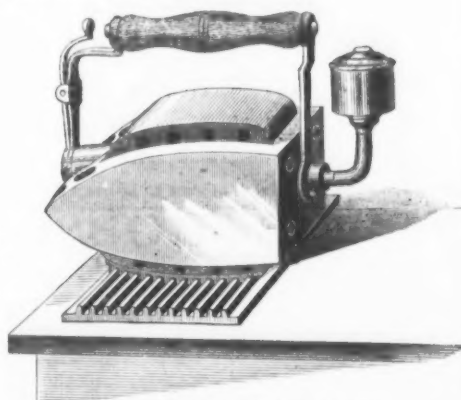
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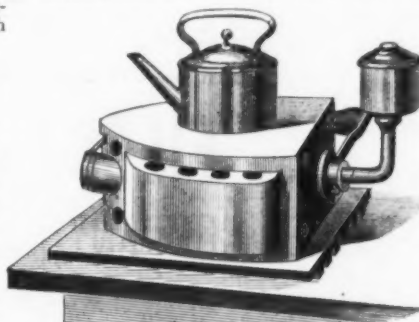
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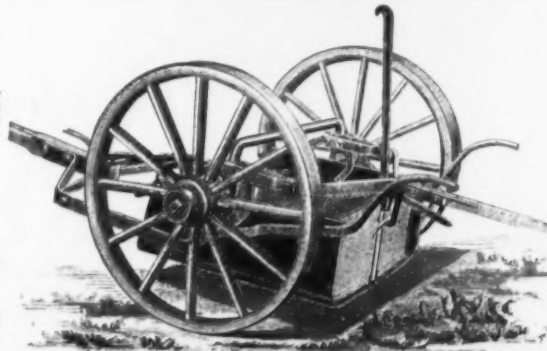


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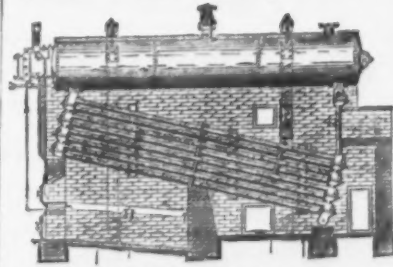


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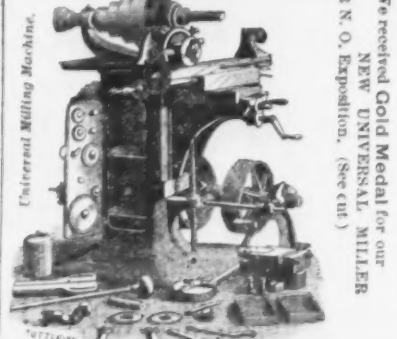
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R. MUSHET'S  
SPECIAL STEEL

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Turns out at least DOUBLE WORK by increased speed  
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Steel. Neither hardening nor tempering required.

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STEEL AND IRON RAILS,  
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SPRING STEEL

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Exclusively for the

Analysis of Ores of Iron, Pig and Manufactured  
Iron, Steels, Limestones, Clays,  
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Metallurgical Purposes.

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With Branch at Warrenton, Virginia.

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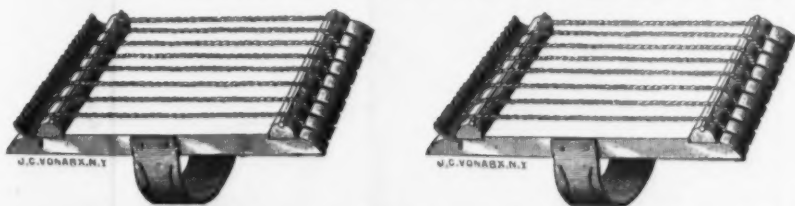
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**NEW IMPROVED PATENT WIRE CURRY COMB.**



Lightest and best for general use. Most durable Comb made. Most humane and only Comb fit to use on a horse's legs, shoulders and flanks. It lifts every hair and throws out the dirt. Rubs and cleans the skin, but cannot cut or scratch it. Is without a rival for cleaning a muddy or sweaty animal. A wonder on a shedding horse. It cleans itself, and has an improved attachment which cleans a brush with ease and rapidly. Send for Circulars and Prices. Sample by mail, 30 cents.

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ESTABLISHED 1845.

The annexed cut shows one of the many styles of Coffee Mills of our manufacture, especially adapted to Grocers' use and all retailers of coffee. They are highly ornamental, and workmanship of the very best. We make more than 30 styles.

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Will roast 30 to 40 lbs. at once, and can be used as a stove at other times. Send for descriptive list to Manufacturers.

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Our agents, John H. Graham & Co., 113 Chambers St., New York carry a full line of our goods, and will be pleased to serve you at factory prices.

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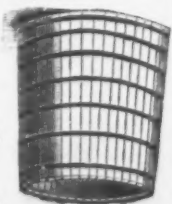
**ECLIPSE WIND MILLS**

20 SIZES.

Hand, Force and Power Pumps,  
MANUFACTURERS OF CYPRESS AND YELLOW PINE

**TANKS.**

STEAM PUMPS for every duty. Railroad Water Supplies a Specialty.



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## THE IRONMONGER,

HALF YEARLY SPECIAL ISSUE,

ON SEPTEMBER 19, 1885.

The recipients of this number of "THE IRONMONGER" will be Ironmongers, Hardware Dealers, Implement Agents, Exporters, Importers, Manufacturers and Venders of all kinds of Machinery, Domestic Contrivances, Electroplate, and, in short, all the many classes of persons whom British Manufacturers in the Iron, Steel, Hardware and Metal Trades should reach. The circulation of this number of "THE IRONMONGER" will not be less than

**12,000 COPIES.**

"THE IRONMONGER" circulates in every country where British Goods are likely to find customers—British Colonies, Australia, New Zealand, The Cape, Natal, India, Canada, Continent of Europe, Asia Minor, Egypt, China, Japan, The United States, South America, &c., &c. Special attention will be paid to the above-named countries, the leading traders in which will receive copies; and from our past experience we can confidently predict that they will not fail to make use of them. It is abundantly apparent that the occasion will be a most advantageous one, and all Hardware Manufacturers should

**ADVERTISE IN THIS SPECIAL ISSUE,**

to ensure the full benefit of a Home and Foreign representation. For Tariff of Advertisements and Circulars, address the Publisher,

OFFICE, 42 CANNON STREET, LONDON, E. C., ENGLAND.

Will Shortly be Issued,

## THE IRONMONGER DIARY,

1886, SEVENTEENTH YEAR OF PUBLICATION.

The above important Work is now in course of preparation. All who are anxious to do business with Ironmongers, Agricultural Implement Agents, Engineers, Merchants, Shippers, &c., should make good use of this most valuable ADVERTISING MEDIUM.

A COPY OF THIS DIARY WILL BE

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to every subscriber to THE IRONMONGER; hence Advertisers will know that their Announcements will be all the year round under the notice of the principal Iron, Steel, Metal, Implement, and Hardware men at home and abroad.

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In our 1884 Diary we made a beginning in this direction and received a most gratifying amount of support. The cost (10s. per square of 1 inch deep by 1½ inches wide) is so insignificant that no firm or company would be wise to be absent from the Section on that account, while there are many very sound and weighty reasons why every trade-mark, brand, special name, &c., should be registered in this manner.

◀ THE DIARY FOR 1885 ▶

will be handsomely got up, bound in Cloth, Gilt, and will contain, besides the Diary Pages proper (which are interleaved with Blotting Paper), much valuable information of special interest to Members of the Trades represented by THE IRONMONGER.

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Burglar-Proof Sash Lock

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Cheapest, Strongest and Only Practical Automatic Lock and Holder on the Market.

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OF OPEN-HEARTH AND CRUCIBLE STEEL,  
EQUAL TO STEEL FORGINGS.

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Being desirous of securing a share of public patronage, we will endeavor to make our product better in quality than any in the market.

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**FRUIT WINE**  
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 TWENTY DIFFERENT SIZES FROM \$2.75 TO \$100  
 AWARDED FIRST PREMIUM EVERYWHERE  
**Nº 20 COFFEE MILL**  
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**THE BEST**  
**ARE THE**  
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**PEUGEOT FRÈRES,**  
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**Finest Grades of Steel**  
 FOR WATCH, CLOCK AND OTHER SPRINGS,  
 Band Steel for Saws for Metal and Wood. Steel for all Mechanical Uses. The  
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 Correspondence Solicited.  
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**BENEDICT'S PAT. WINDOW SCREEN**  
 is an Oil-Print Linen Gause, plain and figured, mounted  
 on a Hartshorn Spring Roller, the edges moving in  
 grooved mouldings on the sides of the window.  
 Flies and mosquitoes are effectually excluded.  
 The following advantages over all other kinds of  
 Screens will be apparent:  
 The whole window is covered.  
 Either Sash may be opened or both at the same time,  
 thus securing better ventilation.  
 More easily handled, working as easily as an ordinary  
 Shade.  
 Does not interfere with either Shade, inside Shutter or  
 outside Blind.  
 May be rolled up and left in place all winter; but if  
 desirable to remove, comes out as readily as a shade,  
 and occupies but little space.  
 Costs less, will last longer and is more easily renewed  
 than any other good screen.  
 Illustrative cuts and prices may be obtained by ad-  
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**THE BENEDICT**  
**Patent Rolling Window Screen Co.,**  
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 State Rights for sale.

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**EDGE TOOLS & MACHINE KNIVES**  
 Coopers', Carpenters' and Ship Tools, Cleavers, &c.  
 FULL LINE CHISELS.  
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**Patent Lock Snap.**  
  
 The neatest and safest device ever invented for hitch-  
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 Guard, 75 cents. Bicycle Chain, 75 cents. These goods  
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 Send for one. Try it and you will use no other.  
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 The only vegetable Metal Polish in the market. A  
 clean, pure, cream white paste. Cheap, convenient,  
 and always ready for use. Superior to anything of  
 the kind heretofore offered to the public for cleaning  
 Brass or other Metal signs, Railings, Show Cases,  
 Harness Mountings, Hand Instruments, Brass or Metal  
 Lamps, Guns, Bicycles, Locomotive Head Lights, &c.  
 Especially adapted to Marine, Railroad and Fire En-  
 gine work (hot or cold). Warranted to contain no  
 acids or gritty substances and will not injure Jour-  
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 Manufactured only by the MATCHLESS METAL POL-  
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 GUARANTEED THE BEST & CHEAPEST  
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 10 TO 20 IN. HORSE MOWERS  
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**THE REIMER IMPROVED**  
**Self-Locking Transom Lifter**  
 answers equally well for all  
 Transoms  
 Hinged at the top.  
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**F. A. REIMER,**  
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**JOHN H. GRAHAM & CO.,**  
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 Send for catalogue.  
 Cut showing the parts belong-  
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 A. The locking bar.  
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 block.  
 C. The operating rod.  
 D. The lower bracket.  
 E. The lifting arm.  
 F. The transverse bracket.

**B. KREISCHER & SONS,**  
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 BEST AND CHEAPEST.  
 Established 1846.  
 Office, foot of Houston Street, East River  
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 Department *Livingston for Stoves, Ranges and Heatproof*  
 superior quality. Miners of and dealers in Wood-  
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**Bricks, Fire Shapes, Kaolin, Fire**  
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 for Furnaces; Cokes, Stoves, Boilers, and  
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**AIKIN'S IMPROVED**  
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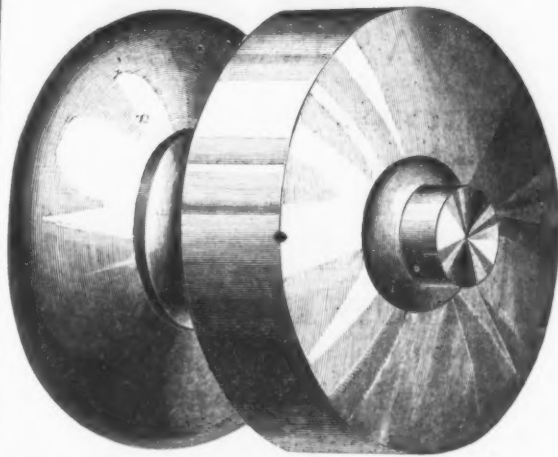
  
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 BEST.  
 Parties looking for a noiseless, econom-  
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**The Iron Age**  
**Self-Binder.**  
 Full Cloth, \$1.25  
 Half Roan, \$1.50  
 We are now prepared to supply our sub-  
 scribers with an excellent self-binder for  
 their papers, a cut of which is annexed.  
 We call attention to the low prices at which  
 it is offered. Address all orders to  
**DAVID WILLIAMS,**  
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## New England Butt Co.



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Door Knobs

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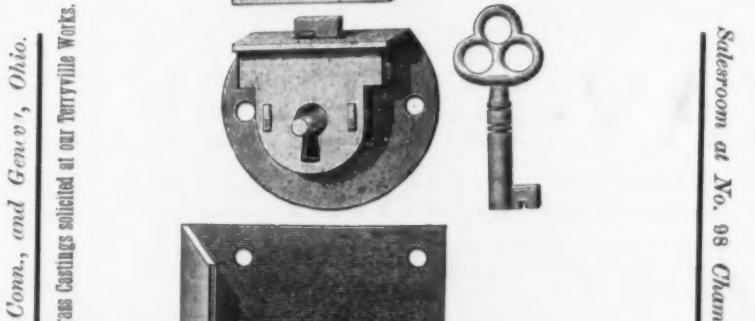
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Catalogue Sent Free on Application.

Providence, R. I., U. S. A.

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**Pipe-Cutting Machines,**  
 MANUFACTURED BY  
**PANCOAST & MAULE,**  
 243 & 245 South Third St.,  
 PHILADELPHIA,  
 ARE  
 EFFICIENT,  
 POWERFUL,  
 CHEAP  
 Send for Circular and Price-List.  
 No. 1.—Hand Pipe-Cutting Machine, cuts 1/2 to 2 inches.  
 No. 2.—Hand Machine, cuts 1/2 to 4 inches.  
 No. 3.—Power Machine, cuts 1/2 to 6 inches.  
 No. 4.—Power Machine, cuts 1 to 4 in.  
 Cutting-Off Machine, cuts 1/2 to 4 in.  
 for Shafting, &c., cuts 1/2 to 4 in.

## EAGLE LOCK CO.

  
 Manufactures at Terryville, Conn., and Genoa, Ohio.  
 Orders for Special Die and Press Work and Small Brass Castings solicited at our Terryville Works.  
 MANUFACTURERS OF THE LARGEST VARIETY OF  
**CABINET, TRUNK AND PAD LOCKS.**  
 MADE BY ANY ONE CONCERN IN THE WORLD.  
 Illustrated Catalogue Mailed to the Trade Free upon Application.  
**FAIRMAN'S**  
**Improved Ice Crusher**  
 FOR 1885.  
 MANUFACTURED BY  
**THE G. F. WARNER MFG. CO.**  
 New Haven, Conn.  
 SOLD BY  
**MALTBY, CURTISS & CO.,**  
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 General Agents for the United States.  
 New York Store, 80 Chambers St.

**Improved Desk Ruler.**  
**STEPHENS & CO.,**  
 RIVERTON, CONNECTICUT,  
 MANUFACTURERS OF  
**U. S. Standard Boxwood and Ivory Rules.**  
 Also, Exclusive Manufacturers of  
**L. C. STEPHENS' PATENT COMBINATION RULE.**  
 Send for Price List. Established in 1854.



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Moist & Supply Hardware Co.  
Terms, 30 days. For 60 or 90 days, interest added at 8 per cent. per annum.

**Anvils.**  
Peter Wright's, 100 lbs., \$100  
Trenton, 100 lbs., 100  
Eagle Anvil, American, 100 lbs., 20  
Apple Parer, 5.50 net  
Penn Apple Parer, 5.50 net  
White Mountain, 5.50

**Axes.**  
Hunt's Kentucky and Yankee, 7 doz, net \$5.50  
William Mann, 7 doz, net \$5.50  
Favorite 7 doz, net \$5.50  
Beveled Axes, 1 doz, net \$5.50  
Double Bit Axes, net \$12.00

**Augers and Auger Bits.** New List January 7, 1885.

Snell's Augers and Bits, 1 doz, net \$5.50  
New Haven Copper Company, 1 doz, net \$5.50  
Benjamin Pierce Auger Bit, 1 doz, net \$5.50  
Jennings' Auger Bits, new list, 1 doz, net \$5.50  
Cook's Auger Bits and Augers, 1 doz, net \$5.50  
Snell's Ship Augers, 1 doz, net \$5.50  
Barnes' Fat, Hol. Augers, list \$4.50  
Stearns Fat, Hol. Augers, list \$4.50

**Balances.** Light and Common, 1 doz, net \$5.50

**Bells.** Bevin Bros. Mfg. Co. Light Hand Bells, 1 doz, net \$5.50

Light Hand Bells, 1 doz, net \$5.50

Swiss Pattern Hand Bells, 1 doz, net \$5.50

Connell's Door Bells, 1 doz, net \$5.50

St. Western & Kentucky Cow, new list, 1 doz, net \$5.50

**Boring Machines.** Upright, without Augers, 1 doz, net \$5.50

Angular, without Augers, 1 doz, net \$5.50

**Bolts.** Eastern Carriage Bolts, new list, June 10, 1884

Philadelphia Carriage Bolts, new list, June 10, 1884

Stanley, Wrought Shutter Bolts, 1 doz, net \$5.50

**Braces.** Barner's Improved, 1 doz, net \$5.50

Barber's Old Style, 1 doz, net \$5.50

Rackus, Polished, 1 doz, net \$5.50

Backus, Nickel, 1 doz, net \$5.50

Spofford, 1 doz, net \$5.50

American Ball, 1 doz, net \$5.50

Amidon Improved, 1 doz, net \$5.50

Amidon Corner Brace, 1 doz, net \$5.50

**Butts.** Cast Fast Joint, Narrow, 1 doz, net \$5.50

Cast Fast Joint, Broad, 1 doz, net \$5.50

Cast Loose Joint, Narrow, 1 doz, net \$5.50

Cast Loose Joint, Broad, 1 doz, net \$5.50

Cast Acorn, Loose Pin, 1 doz, net \$5.50

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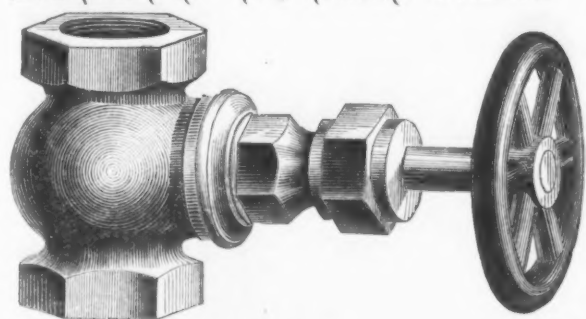
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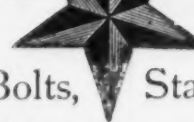


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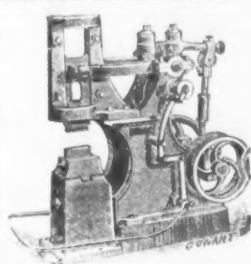
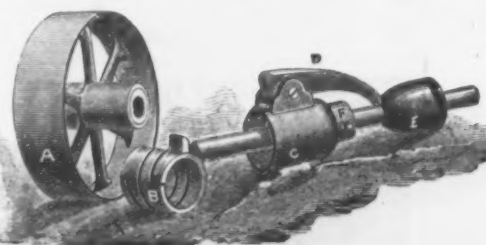
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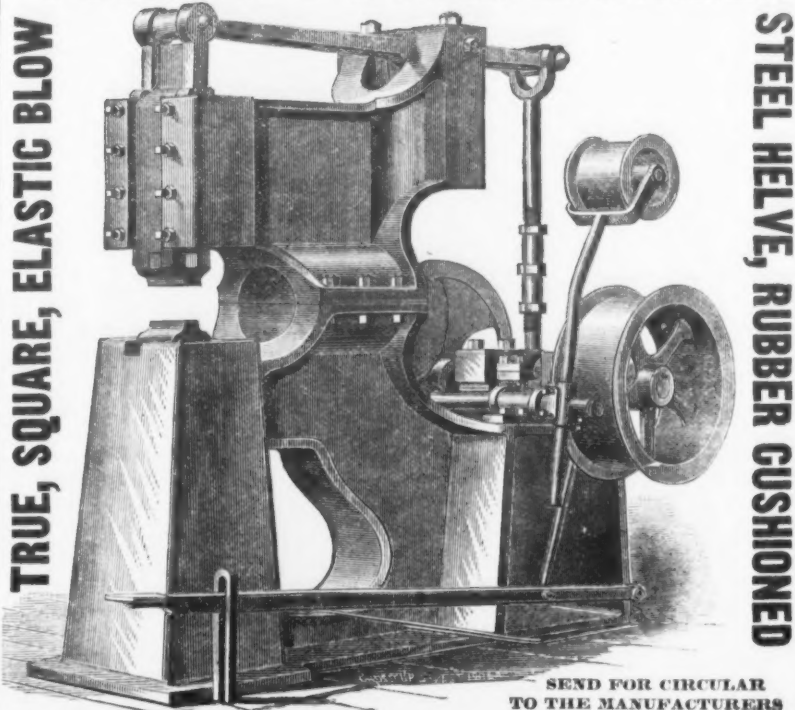
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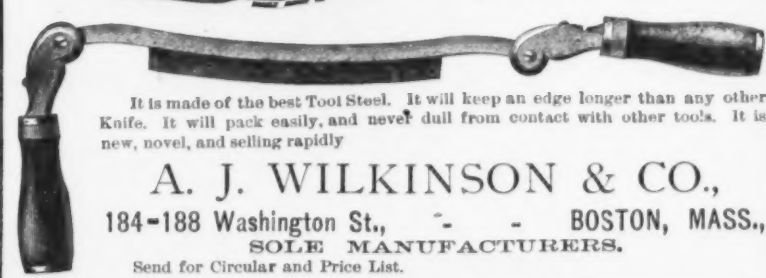
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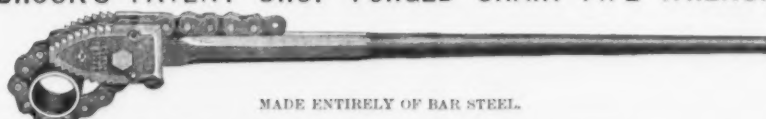
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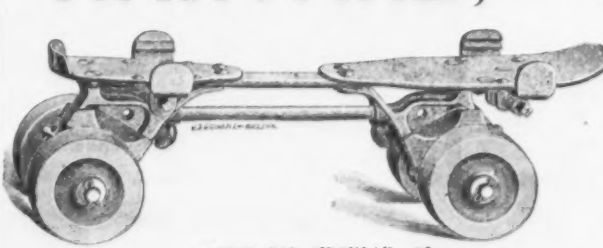


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Each number will fit a range of sizes equal to  
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All parts are interchangeable, and can be read-  
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Made of the very best  
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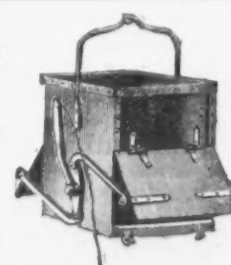
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FOR HANDLING IRON ORE AND COAL.

Dumps Automatically and Saves Work of One Man. Will  
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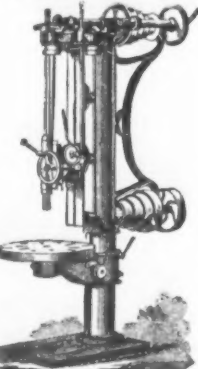
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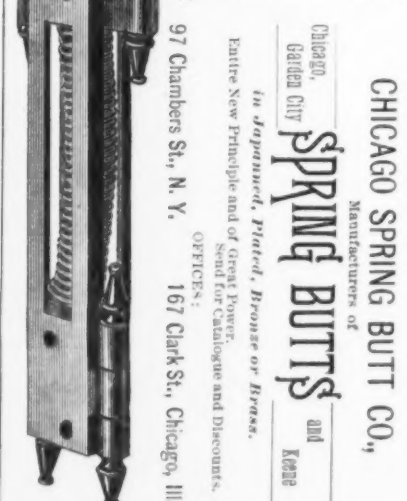
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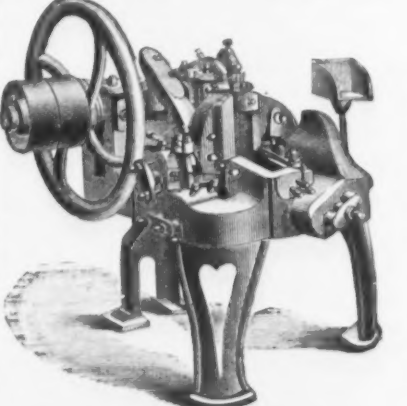
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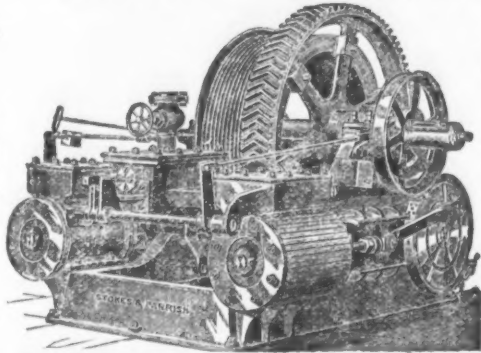
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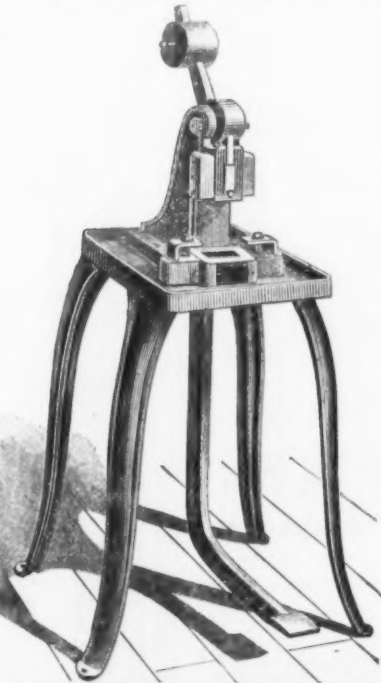
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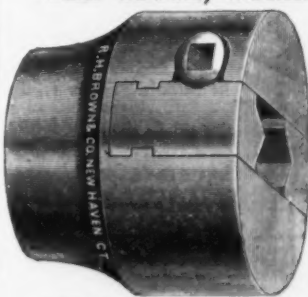
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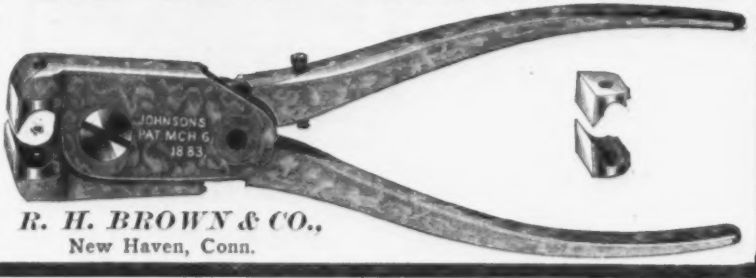
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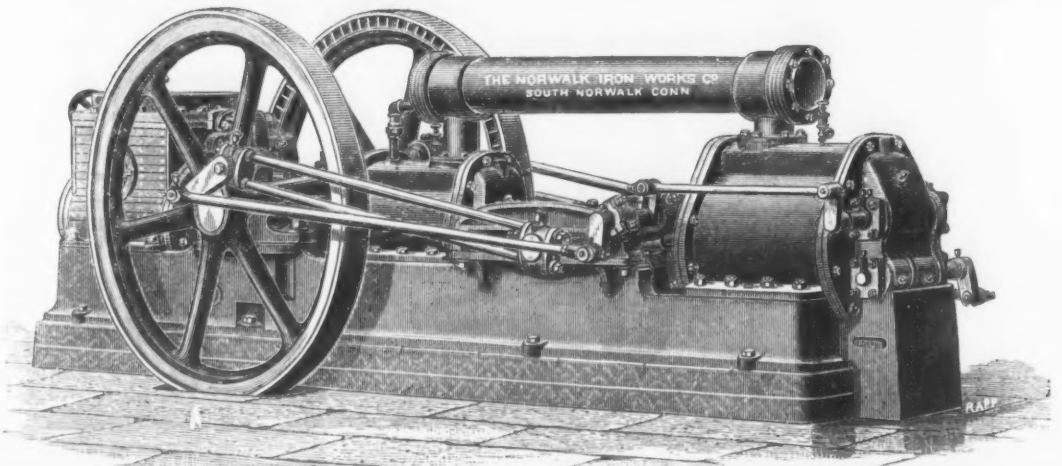
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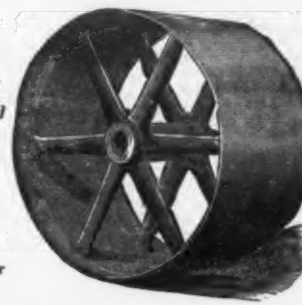


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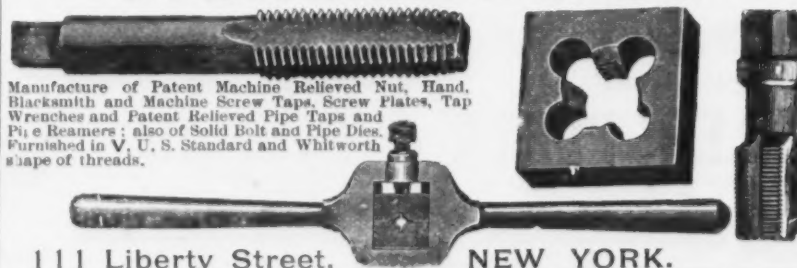
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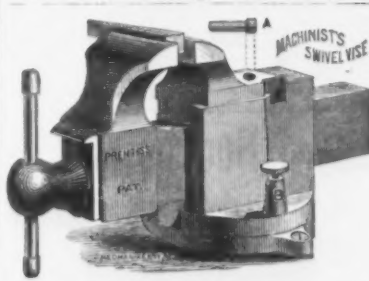
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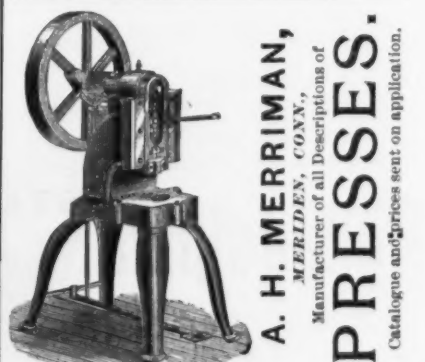
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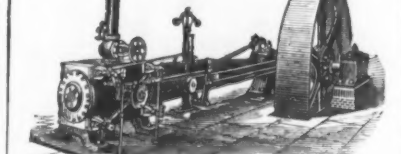
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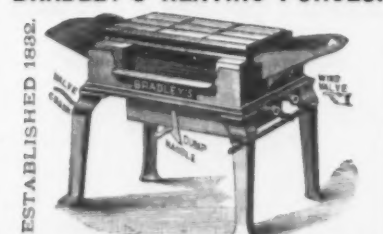
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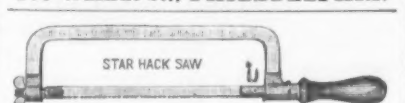
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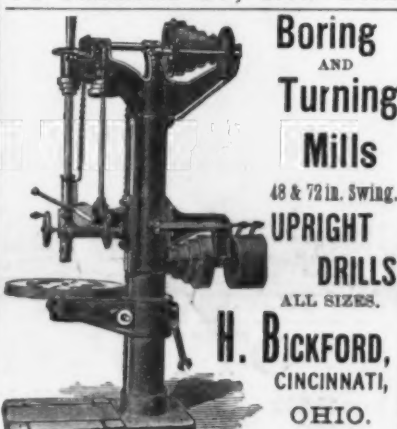
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